Formal knowledge sharing in medium-to-large organizations: Constraints, enablers and alignment

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FORMAL KNOWLEDGE SHARING IN MEDIUM-TO-LARGE ORGANIZATIONS: CONSTRAINTS, ENABLERS AND ALIGNMENT

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ABSTRACT

This research considers one of the most important of resources - knowledge. There is a widespread view that knowledge is important to organizations and this has led to the study of knowledge management. There are a plethora of definitions of knowledge and knowledge management, but knowledge sharing is recognised as being of fundamental importance.

The literature shows the success of knowledge sharing is not only affected by factors including culture, management, technology, processes and structure but, more importantly, it is affected by how these factors interact and fit together. However there is little literature on alignment or strategic fit in knowledge sharing.

This research adds to the literature by investigating the enablers and constraints of knowledge sharing and the possible effects of alignment. An interpretive approach using case studies triangulated with a survey is adopted, involving semi-structured interviews with 23 people across five organizations.

The findings suggest that significant top management support and a strategy for knowledge sharing are necessary precursors of effective knowledge sharing. In the organizations which lacked this, there is little to encourage people to share and almost none of these organizations measured well on any aspect of knowledge sharing. There are widely varying uses of technology, but many are aimed at sharing data or information. Fewer uses of technology are geared to enabling or encouraging the communication necessary for knowledge sharing.

The lack of senior management support may prevent any significant internal or external alignment so a possible approach to strategic fit for knowledge sharing is that strategy has to come first (and the management support that goes with it) and that this should lead to the embedding of the necessary behaviours for knowledge sharing. Only after this are processes and technology able to support knowledge sharing.

CONTENTS

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1 INTRODUCTION

This chapter provides the background to the research and a brief overview of the methodology. It finishes with a descriptive outline of the structure of the whole thesis.

1.1 BACKGROUND

During the 1980s, management research began to focus on organizational resources as a source of competitive advantage (Lado, Boyd, & Wright, 1992; Wernerfelt, 1984). Continuing research tried to identify which resources could provide sustainable competitive advantage and one of the most significant turned out to be knowledge (Barney, 1991; Grant, 1996; Roos & Roos, 1997).

Philosophers have been arguing about the nature of knowledge for over 2000 years. However, in much management research it has become common to look at the distinctions between data, information and knowledge (Alavi & Leidner, 2001; Prusak, 1997). Definitions of knowledge are widespread (Chaim, 2007) but many involve concepts of 'true' or 'personal' belief. Some scholars thus argue that as computers cannot 'believe', they cannot store knowledge at all (Galliers & Newell, 2001).

The importance of knowledge led to the concepts of knowledge management (Sveiby & Lloyd, 1987), the knowledge society and knowledge workers (Drucker, 1993). Knowledge management developed out of a number of disciplines including organizational science, HRM, computer science, MIS and sociology (Maier, 2002). As a result, there is no one, accepted, definition of knowledge management but nearly all of the many definitions imply some form of knowledge sharing.

This plethora of definitions of knowledge and knowledge management also leads to another plethora of knowledge perspectives (Maier, 2002), one of the most prevalent being that of the distinction between 'hard', codifiable explicit knowledge and 'personal', hard-to-define tacit knowledge (Nonaka & Takeuchi, 1995).

Many scholars have looked at the effectiveness of knowledge management and knowledge sharing and have found it to be dependent on many factors including people, technology, process and management (e.g. Ardichvili, Page, & Wentling, 2003; Hariharan, 2005; Kalling & Styhre, 2003; Massey, Montoya-Weiss, & O'Driscoll, 2002 and many others). Despite this, the literature on evaluation in knowledge management is sparse (de Gooijer, 2000; Van Buren, 1999).

The factors involved in knowledge sharing indicate that this is an area of socio-technology so not only are these factors all important, but so is the way they align, fit together or interact. The study of alignment, or fit, has been taking place for many decades in a number of areas although there is little literature concerning alignment and knowledge sharing. However, there is considerable alignment literature in that other socio-technological area, information systems (e.g. Earl, 1989; Ein-Dor & Segev, 1982; Henderson & Venkatraman, 1989; King, 1978).

1.2 Research Question and Theoretical Framework

This thesis is intended to try and fill two gaps in the literature. First, although it is recognised that many areas affect knowledge sharing, there is a need for research to look more precisely into what, within those areas, enables or constrains knowledge sharing. Second, the study of alignment as related to knowledge sharing is lacking. Alignment has proven a valuable tool for information systems (also a socio-technological area), so it has the potential to do the same for knowledge sharing.

The research question is "What factors enable and constrain knowledge sharing in organizations and what is the relevance of alignment?"

The MIT90s study (Scott Morton, 1991) developed a framework for studying alignment and this has been adapted for knowledge sharing to examine the roles of strategy, structure, processes, technology and individuals' roles and skills and the interaction between them. (Figure 1)

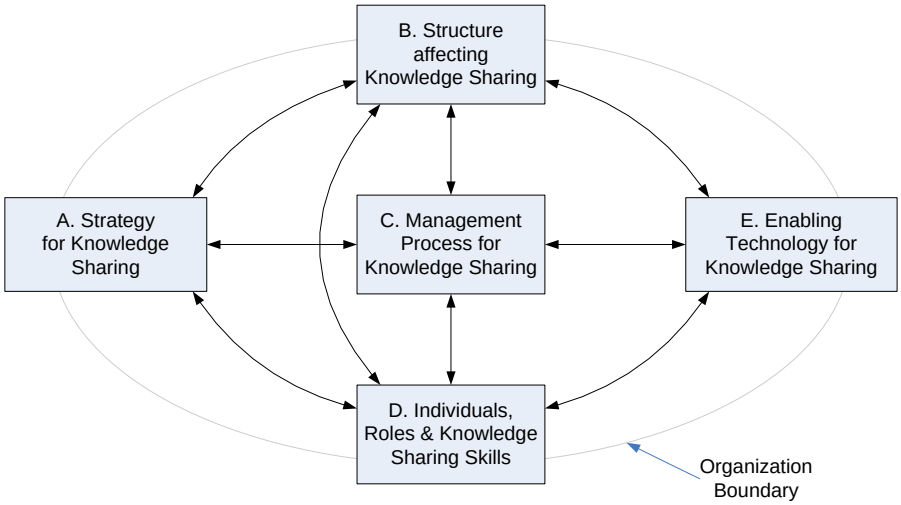

Figure 1: Research Framework

1.3 METHODOLOGY

As this research is studying something intangible from the point of view of various different stakeholders, a positivistic approach is unhelpful. Instead an interpretive discourse approach (Schultze & Leidner, 2002) is chosen.

A variety of methods including action research and grounded theory were considered, but an exploratory case-study approach was eventually chosen as the most suitable (Walsham, 1993; Yin, 1994). A survey instrument was also used in an effort to utilise triangulation to increase validity (Kaplan & Duchon, 1988).

Five organizations agreed to participate. Semi-structured interviews were chosen as the approach to data collection (Coolican, 1999) and a set of guiding questions developed based on the research framework. The survey questionnaire was developed based both on the framework and the Knowledge Management Assessment Tool (Liebowitz & Chen, 2001). Twenty three people were interviewed across the five organizations.

1.4 THESIS OUTLINE

Chapter 2 reviews and synthesises the literature in five sections: knowledge, knowledge management, knowledge sharing, approaches to knowledge sharing and aligning knowledge sharing. It concludes with the development of the research question.

Chapter 3 begins by looking at the range of research philosophies and methodologies that are available and then focuses on those common to knowledge management research, finally choosing a methodology for this research. Relevance of the research is discussed and then a consideration of qualitative research methods leads to a choice of method. Finally, the research design is described.

Chapter 4 provides the within-case analysis of all the interview data. Each organization is taken in turn and the data described and summarised.

Chapter 5 turns to the cross-case analysis. First the findings are tabulated by company against the research framework and then commonalities are discussed and summarised.

Chapter 6 considers the results of the survey. First the respondents are described then the data for each company is discussed and summarised along with a statistical overview. The survey data is also compared and contrasted with the interview data. Finally, an ANOVA analysis of the data between companies is given. (Detailed statistics are provided in Appendices 2 and 3.)

Chapter 7 is the discussion chapter, looking at constraints and enablers in terms of the research framework, approaches to KM and the areas of alignment and strategic fit.

Chapter 8 presents the conclusions, considering both theoretical and practical contributions. Finally further thoughts on the research design, limitations of the research, future research and the PhD process are discussed.

Appendix 1 shows the survey form.

Appendix 2 gives the detailed survey statistics and box plots.

Appendix 3 shows the survey histograms.

Appendix 4 shows the job titles of all the survey respondents.

Appendix 5 lists the NVivo coding nodes used.

2 LITERATURE REVIEW

The purpose of this chapter is to analyse existing research into the enablers of, and the constraints on, knowledge sharing and how they may be affected by alignment. However, before this can be done, it is necessary to consider the background on knowledge management and knowledge itself. The approach to this is shown diagrammatically in Figure 2.

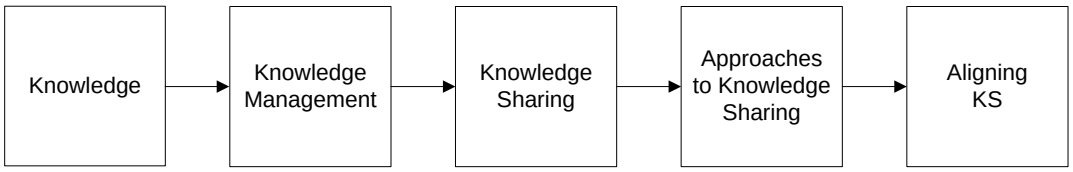

Figure 2: Literature Review Structure

The first section will look at knowledge – its importance in the organization, its relationship to data and information and its definition. Next the origins and definitions of the term *knowledge management* are discussed. This leads on to sections on knowledge sharing: its importance and the areas affecting it. Finally, alignment is discussed along with its possible role in relation to knowledge sharing. The diagram will be repeated throughout this chapter with the relevant section highlighted to assist in following the structure.

2.1 KNOWLEDGE

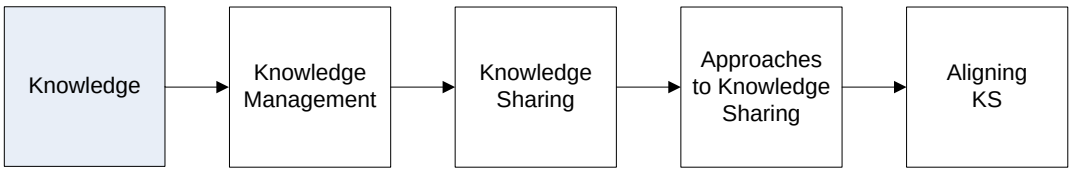

Figure 3: Literature Review Structure – Stage 1

2.1.1 KNOWLEDGE AND THE ORGANIZATION

Up until the 1980s, most management theory focused on a company's environment as the basis for understanding competitive advantage. The role of management was to combine products and markets while taking into account customers, suppliers, entry barriers and technologies (e.g. Grant, 1991; Porter, 1980). This approach began to be challenged in the 1980s when a school of thought – originating much earlier (Penrose, 1959) – suggested that competitive advantage did not just arise from product-market combinations in particular industries, but was due to differences of organizational resources of different kinds (Lado et al., 1992; Wernerfelt, 1984). Barney (1991) developed four criteria to assess what kinds of resource could provide sustainable competitive advantage. These were: value creation for the customer, rarity compared to the competition, imitability, and substitutability. Roos and Roos (1997) suggested that only *knowledge* met all four of these criteria and could thus offer sustainable competitive advantage. Massingham takes this further saying 'knowledge-based assets are now the major sources of competitive advantage in international business.' (2004, p.51)

Strategic management research thus shifted towards the concept of resources as the main source of sustainable competitive advantage and knowledge was one of the most important of these resources (Grant, 1996). Indeed, 'knowledge is a remarkable substance. Unlike other resources, most forms of knowledge grow rather than diminish with use'. (Adler, 2001 p.14)

2.1.2 KNOWLEDGE

The concepts of knowledge have been debated in western philosophy for many centuries (Russell, 1961). The Greek philosophers such as Socrates, Plato and Aristotle initiated western thinking about knowledge and based it around the process of knowing. In general, these philosophers held to the idea of an objective reality and hence the concept that knowledge could represent objective truth. During the 17th and 18th centuries, the rise of science led to a succession of philosophical developments. Francis Bacon coined the phrase 'Knowledge is power' (Rodriguez Garcia, 2001) and Descartes' 'I think, therefore I am' introduced subjectivism. Kant then developed the concept of knowledge as 'justified true belief'. Since the 19th century, many more philosophical perspectives have appeared including constructivism, critical theory, critical rationalism, empiricism and pragmatism (Maier, 2002, p.52). These schools of thought have never reached a consensus about their understanding of knowledge and Russell (1992) believes that this imprecision in the definition of things like knowledge is inevitable. However philosophers have a different agenda to those studying knowledge management or organizational sciences and 'the concept of socially constructed knowledge has been well received within the [Organizational Learning] and [Knowledge Management] community' (Maier, 2002, p.54).

2.1.3 DATA ⇨ INFORMATION ⇨ KNOWLEDGE

Within the KM literature, it is common to consider the definition of knowledge by distinguishing between knowledge, information and data (e.g. Alavi & Leidner, 2001; Prusak, 1997) and considering the hierarchical relationship between them.

According to Davenport and Prusak (1998), *data* are a set of distinct, objective facts about events which say nothing about their own importance or relevance. They describe *information* as a message with a sender and a receiver that changes the perceptions of the receiver - 'Think of information as data that makes a difference.' Their definition of *knowledge* is 'a fluid mix of framed experience,

values, contextual information, and expert insight that provides a framework for evaluation and incorporating new experiences and information.' Vance (1997) defines information as data interpreted into a meaningful framework whereas knowledge is information that has been authenticated and thought to be true.

'Wisdom' is sometimes added to the top of the data-information-knowledge hierarchy (e.g. Ackoff, 1989), but its appearance is less widespread in the literature.

It is unclear exactly where this hierarchy originated but Sharma (2006) believes that the first mention in the information science domain was that of Cleveland (1982) who also illustrated it thus:

Figure 4: Information, Knowledge and Wisdom

Originally published in THE FUTURIST, Vol. 15, No. 5, December 1982. Used with permission from the World Future Society, 7910 Woodmont Avenue, Suite 450, Bethesda, Maryland 20814 USA. Telephone: 301-656-8274; www.wfs.org.

Checkland and Holwell (1998) add in a further classification of 'capta' between data and information. They define capta as the subset of data to which attention is paid.

> *"Data is a starting point in our mental processing. Capta are the result of selecting some for attention … Turning data into capta is a very familiar mental process, so familiar in fact that it has become completely transparent to us: we do it all the time without noticing the process occurring, which is presumably why we have found it necessary to make up the word 'capta'." (Checkland & Holwell, 1998 p.89)*

The consideration of capta as something distinct from data may well be relevant in some situations, but capta can be considered as a subset of data within the discussions that follow.

2.1.4 KNOWLEDGE DEFINITIONS

Discussing organizational knowledge, Nonaka (1994, p.15) defines knowledge as 'justified true belief' emphasising that while philosophers focus on the 'truthfulness' aspect, 'it is important to consider knowledge as a personal "belief" and emphasize the importance of the "justification" of the knowledge'. Alavi and Leidner (1999, p.5) take this a step further to 'Knowledge is a justified personal belief that increases an individual's capacity to take effective action' and suggest that information becomes knowledge once it is processed in the mind of an individual. Galliers and Newell have taken this 'justified true belief' approach to argue that computers cannot manage knowledge at all – as computers cannot 'believe', how can they transfer knowledge? 'A particular version of *truth* can be transferred but, were this to be understood by the intended recipients (and this in itself is unlikely), it may not be accepted given alternative *justified true beliefs*.' (Galliers & Newell, 2001, p.611). They go on to argue that what **can** be transferred using IT systems is 'not even information, but data'. This is supported by Scruton who says:

> 'Information Technology *simply means the use of digital algorithms in the transference of messages. The* information *that is processed is not information* ***about*** *anything, nor does it have its equivalent in knowledge. It treats truth and falsehood, reality and fantasy as equivalent, and has no means to assess the difference'. (Scruton, 2007, p.31)*

Although most scholars support the data ⇨ information ⇨ knowledge progression, Tuomi takes the opposing view that data and information only emerge after knowledge is available. 'Data can emerge only if a meaning structure, or semantic, is first fixed and then used to represent information.' (Tuomi, 1999 p.107). He argues that knowledge is structured, articulated and verbalised to produce information. This information can then be represented and interpreted into small pieces with no individual meaning - for example in a database – thus creating data.

Regardless of whether a Data-Information-Knowledge or Knowledge-Information-Data view is accepted, both suggest that to move from data to either information or knowledge (or vice versa), some form of communication is necessary and that knowledge involves human intervention. This is emphasised by the content-oriented view of knowledge as 'an entity, potentially partly obscure, that can be passed around between individuals, with a certain degree of difficulty, and with varying degrees of communicational success.' (Kalling & Styhre, 2003 p.75). Swan et al. (1999) also stress the importance of human interaction -

> *"Cognitive, IT-led approaches to KM typically fail to take into account the pre-existing organizational structures, norms and cultural values that lead different groups to have divergent, possibly even irreconcilable, interpretations of what needs to be done and how best to do it. They unrealistically assume that building networks that provide structural links between these different groups will somehow automatically produce knowledge creation and sharing. The community view recognises that knowledge has to be continuously negotiated through interactive social networking processes." (Swan et al., 1999, p.273)*

- They continue by contrasting two organizations one of which had little KM success using a highly IT-driven, codification approach whilst the second had considerable success with a KM approach that emphasised knowledge sharing.

Although alternative definitions abound – Chaim (2007) offers 130 definitions of data, information and knowledge from 45 scholars - this thesis defines knowledge as *a justified personal belief (thus requiring human intervention) which leads to increased competence and capacity for action*. Although there are arguments both for and against whether computers can store knowledge, this requirement for human intervention implies that IT systems cannot store or manage knowledge at all as computers cannot 'believe'. Knowledge thus comes from individuals, and so to build organizational knowledge, organizations need to create and support an environment where individuals can create and share knowledge - which information technology might be able to support or facilitate.

2.1.5 KNOWLEDGE PERSPECTIVES

Efforts to understand the management of knowledge have led to knowledge being considered from a number of perspectives (Maier (2002) lists chronologically over 20 different classifications of knowledge). Ryle (1949) introduced the concepts of 'knowing how' and 'knowing that' and this was expanded by Sackmann (1992) into the four categories dictionary knowledge (what?), directory knowledge (how?), axiomatic knowledge (why?) and recipe knowledge (what should?). Quinn et al. (1996) has similarities to this, proposing cognitive knowledge (know-what), advanced skills (know-how), systems understanding (know-why) and self-motivated creativity (care-why). Two other examples of multiple categories are Collins' (1993) classification looking at the location of knowledge – embrained knowledge (brain), embodies knowledge (body), encultured knowledge (social system) and symbol-type knowledge (symbols) – and Bohn's (1994) categorisation of eight stages of knowledge – complete ignorance, awareness, measure, control of the mean, process capability, process characterisation, know why and complete knowledge.

Theories about knowledge within the KM community are equally varied but many tend to view knowledge as a dichotomy. Conklin (1996) uses the terms formal and informal knowledge and describes the former as easily shared and found in books and manuals and the latter as the knowledge used to create formal knowledge. Kogut and Zander (1992) make a distinction between 'know how' and information while Seely Brown and Duguid (1998) differentiate 'know how' and 'know what'. Hildreth & Kimble (2002) simply use the terms hard knowledge and soft knowledge. One of the most prevalent dichotomies is the distinction between tacit and explicit knowledge: "*Almost from the beginning, knowledge management has explored the differences between tacit and explicit knowledge, between 'know how' and 'know what'.*" (Prusak, 2001, p.1004).

Polanyi (1966) developed the idea of the distinction of tacit and explicit knowledge which differentiates between 'hard' codifiable explicit knowledge that can be defined and transmitted in a formal, systematic language and tacit knowledge that is more personal and hard to define or quantify. This

tacit/explicit codification has been the subject of much further research and has been concisely described by Nonaka and Takeuchi:

> *"...we classify human knowledge into two kinds. One is explicit knowledge, which can be articulated in formal language including grammatical statements, mathematical expressions, specifications, manuals, and so forth. This kind of knowledge thus can be transmitted across individuals formally and easily. ....A more important kind of knowledge is tacit knowledge, which is hard to articulate with formal language. It is personal knowledge embedded in individual experience and involves intangible factors such as personal belief, perspective, and the value system." (Nonaka & Takeuchi, 1995, p viii)*

Svieby (1997) looks at these concepts and comments that 'language alone is not enough for making knowledge explicit' and Argyris (1999) considers tacit knowledge to be of considerable importance and one of the fundamental ingredients of good or bad management. Thompson and Walsham (2001) look at these concepts of explicit and tacit knowledge and develop them into objective and inter-subjective knowledge. They comment 'the danger for organizations therefore lies in confusing those types of knowledge which are indeed directly transferable via technology with those which are not'. Skyrme (2001) expands on this by looking at tacit and explicit knowledge as 'knowledge in people' and 'knowledge in objects' as shown in Figure 5.

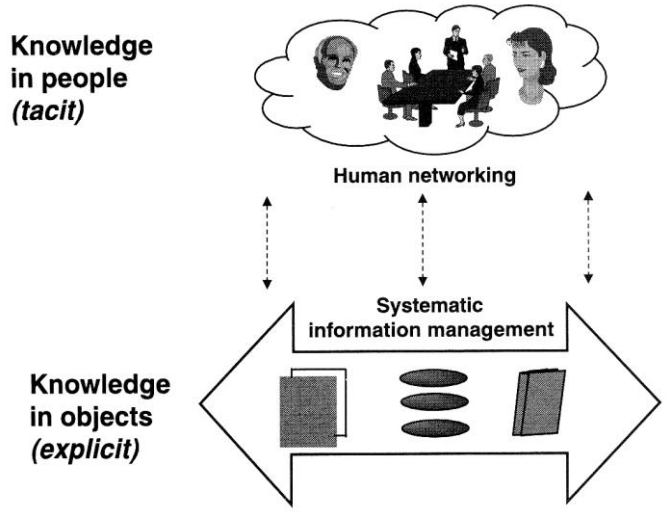

Figure 5: Two perspectives of Knowledge.
(Skyrme, 2001, p.7)

This distinction is supported by Holsapple & Joshi (2002, p.52) who suggest that knowledge 'can be stored, embedded or represented in an organization as any of six different kinds of resources: 1) participants' knowledge, 2) culture, 3) infrastructure, 4) knowledge artefacts, 5) purpose, and 6) strategy'. Their 'knowledge artefacts' relate to Skyrme's 'knowledge in objects' but in addition most of their other resources involve both knowledge in people and in objects. For example, when discussing 'participants' knowledge', they explain that participants may be either human resources or material resources such as computer systems.

However, not all academics or practitioners accept such a categorical, either/or approach to tacit and explicit knowledge and prefer to consider that all knowledge falls somewhere along a tacit – explicit continuum (e.g. Blackler, 1995; Boland, Tankasi, & Te'eni, 1994; Hall & Andriani, 2003; Jasimuddin, Klein, & Connell, 2005). These different approaches have implications for how knowledge is transferred or shared.

2.2 KNOWLEDGE MANAGEMENT

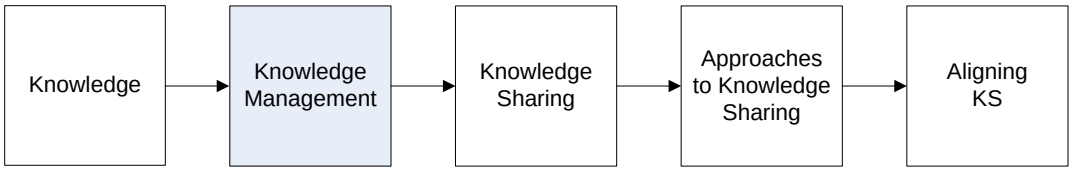

Figure 6: Literature Review Structure – Stage 2

2.2.1 INTRODUCTION

The origins of the term *knowledge management* go back to the late 1960s when Zand (1969) spoke of 'management of the knowledge organization' rather than knowledge management, but foresaw the emergence of the knowledge society and knowledge workers. Rickson (1976) used the term knowledge management but in a different context – analysing the process of development and application of knowledge in societies, not organizations. The term re-emerged in the mid

1980s in the context still used today when Sveiby & Lloyd (1987) distilled their ideas on intellectual capital and knowledge. Although rarely mentioning knowledge specifically, Senge (1990) - subtitled 'The art and practice of the learning organization' – emphasises challenging preconceived mental models, building shared visions and facilitating team learning, all of which are relevant to knowledge creation and sharing. Later, Drucker (1993) introduced the concepts of the knowledge society and knowledge workers along with the idea that the 'basic economic resource' would become knowledge rather than capital, labour or natural resources.

Prusak (2001) discusses the development of knowledge management from both intellectual and practical sources although he goes on to warn "*There is, of course, continual two-way traffic between the worlds of theory and practice. I distinguish here between intellectual and practical antecedents for rhetorical convenience, but they are not as distinct as this treatment suggests. Reality is far more blended, messier, and more interesting*." (Prusak, 2001, p.1003). As intellectual antecedents, he suggests first economics and the drive for organizational learning that arose out of it; second sociology and its growing emphasis on real, observable behaviours. Last, he focuses on philosophy and psychology and how knowledge management has both considered the distinction between 'know how' and 'know what' and how and why people learn, act, forget, etc. He suggests the three practices that have brought most to knowledge management are information management and its discovery that different types of information could have different value and need different handling; the quality movement and its focus on processes, internal customers and shared goals; and the human factors/human capital movement and its premise that the value of people to an organization can grow with an investment in training and education.

Maier expands on this:

> *"The most profound effects have come from the following research disciplines: organization science and human resource management (HRM), computer science and management information systems, management science, psychology and sociology." (Maier, 2002, p.18)*

and goes on to list the relevant fields within each discipline. (Table 1)

Organization Science and HRM	Organizational change & management of change Organization development & learning Organizational memory & intelligence Organizational culture Theories of evolution of organizations HRM
Computer Science and MIS	Information processing Systems theory Artificial intelligence
Management Science	Strategic management Other management approaches
Psychology and Sociology	Organizational psychology Organizational sociology Sociology of knowledge

Table 1: Academic precursors to KM
(Developed from Maier, 2002 pp 19-29)

As a result, the term *knowledge management* does not have one generally accepted definition due to the multitude of backgrounds and disciplines from which the researchers involved have come from, bringing with them varying perspectives on the definition of knowledge.

2.2.2 DEFINITIONS

Most managers have trouble defining knowledge management. 'They know it's something they just have to get to – even if they don't know exactly what it is.' (Stuart, 1996). However, there is clarity to be gained by thinking of knowledge management as management *for* knowledge rather than management *of* knowledge.

These various perspectives and ideas lead to a wide variety of definitions of knowledge management and a number of examples are given in Table 2.

Build, transform, organize, deploy and use knowledge. (Wiig, 1997)
Identifying and leveraging the collective knowledge in an organization to help the organization compete. (von Krogh, 1998)
The process by which the organization generates wealth from its intellectual capital or knowledge-based assets. (Bukowitz & Williams, 1999)
Concerned with capturing an organization's know-how and know-what through creation, storage, distribution and application. (Miller, 1999)
Acquirement, retrieval, generation, storage, distribution and externalization of knowledge. (Holsapple & Joshi, 2000)
Creation, capture, organization, access and use of knowledge. (Soliman & Spooner, 2000)
Creation of knowledge repositories, improvement of knowledge access, enhancement of knowledge environments and management of knowledge as an asset. (Rowley, 2000)
Process of knowledge creation, validation, presentation, distribution and application. (Bhatt, 2001)
The identification and communication of explicit and tacit knowledge residing within people, processes, products and services. (Bollinger & Smith, 2001)
The implementation of knowledge strategies comprises all person-orientated, organizational and technical instruments, suitable to dynamically optimise the organization-wide level of competencies, education and ability to learn of the members of the organization as well as to develop collective intelligence. (Maier, 2002)

Table 2: Knowledge management definitions

Notably, nearly all of these definitions above imply some level of knowledge sharing.

Knowledge management is defined in this thesis as *the management function responsible for the selection, implementation and evaluation of strategies aimed at improving the way the organization handles knowledge in order to improve performance*. However, precisely how this is done and how knowledge strategies are defined will depend on the organization's own perspectives of knowledge and knowledge management.

2.3 KNOWLEDGE SHARING

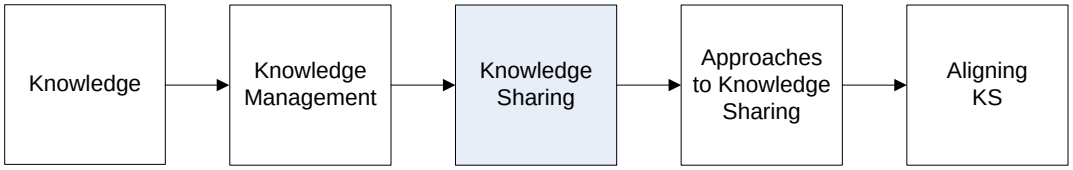

Figure 7: Literature Review Structure – Stage 3

As has been discussed earlier, nearly all definitions of knowledge management have something to do with sharing knowledge.

Sharing knowledge has been variously defined as 'activities of transferring or disseminating knowledge from one person, group or organization to another' (Lee, 2001, p.324); 'the process where individuals mutually exchange their (implicit and explicit) knowledge and jointly create new knowledge' (van der Hooff & de Ridder, 2004, p.118) and as 'the transfer of knowledge, mostly by information media, and the interpretation of the newly received knowledge within and by existing knowledge of the receiver' (Wijnhoven, 1998, p.143). Definitions of knowledge sharing are thus more consistent than those of knowledge management and this thesis thus defines knowledge sharing as *an activity through which knowledge is exchanged amongst people*.

Alavi and Leidner (1999) asked a group of senior managers about knowledge management in their organizations and found three different perspectives: Information-based, technology-based and culture-based. Information-based organizations focussed on readily accessible information archives, categorisation and filtering of data and corporate yellow pages. Technology-based firms were heavily involved with data warehousing /mining and expert systems while those with a culture-based approach were cultivating intellectual property and supporting continuous and collective learning. Similar groupings were found when considering the capabilities needed for knowledge management and the concerns related to knowledge management. Although this study was about knowledge management, many of the points raised are actually about the importance of knowledge sharing.

Similarly, Alazmi and Zairi (2003) surveyed critical success factors in knowledge management considered in 15 earlier papers and found that knowledge sharing (along with technology infrastructure) was the most often quoted.

Nonaka (1994) builds on the tacit/explicit dimension discussed earlier and looks at the four possible modes of knowledge conversion between tacit and explicit knowledge (Figure 8): tacit to tacit, explicit to explicit, tacit to explicit and explicit to tacit. He defines these modes as Socialization (where tacit knowledge is shared through interaction between individuals), Combination (where social processes are used to combine different bodies of explicit knowledge held by individuals), Externalization (the conversion of tacit into explicit knowledge, where 'metaphor' plays an important role) and Internalization (the conversion of explicit into tacit knowledge which bears some similarity to the traditional notion of learning). This is known as the SECI model (Figure 8).

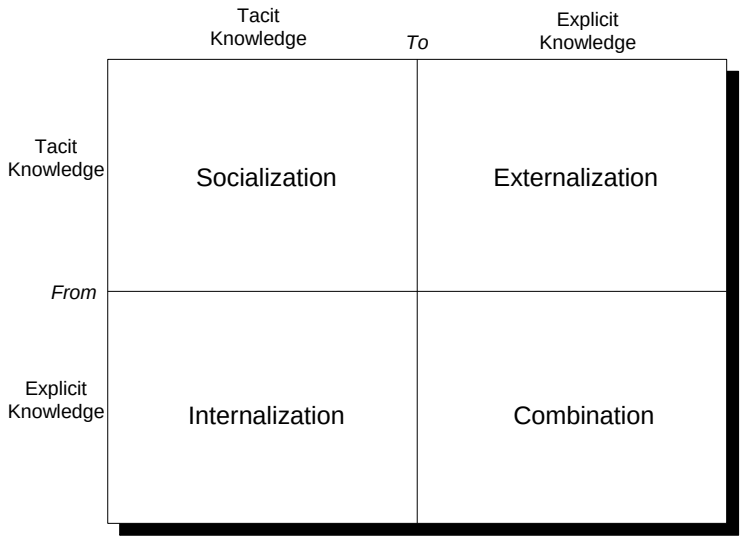

Figure 8: SECI Model.
(Nonaka, 1994, p.19)

Nonaka then develops a 'spiral of organizational knowledge creation' between these modes beginning with the individual and expanding through increasing sizes of groups/organizations and discusses where the interactions between the two types of knowledge leads to the creation of new knowledge. Each stage of the spiral involves sharing knowledge.

Nonaka and Konno (1998) introduced the concept of 'Ba' which is described as a shared space for emerging relationships which serves as a foundation for knowledge creation. Socialization involves the sharing of tacit knowledge between individuals and relies on physical proximity amongst those people and spending time together. This is supported by what is called *Originating Ba* which is the 'space' where individuals can share feelings and experiences. Externalization requires some means whereby tacit knowledge can be explained in terms that are understandable to others and *Interacting Ba* supports this. This involves careful selection of teams and groups with the right mix of specific knowledge and abilities along with the widespread use of dialogue and metaphors. The key issues of combination are the systemization of knowledge and communication, which in practice means the capturing, editing, and dissemination of explicit knowledge. This is the space of *Cyber Ba* and is where information technologies supporting collaborative working come into their own. Internalization turns the explicit knowledge of the organization into the tacit knowledge of the organization by making it ingrained at the individual level. Exercising Ba supports this through focussed training and teaching. (Figure 9) All of these involve the concept of sharing knowledge and 'a firm can be viewed as an organic configuration of various ba, where people interact with each other and the environment based on the knowledge they have and the meaning they create' (Nonaka & Toyama, 2003, p.9).

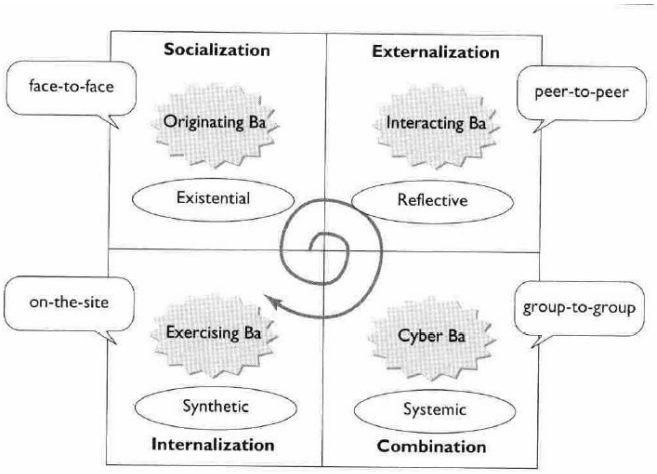

Figure 9: Ba and the SECI Model.
(Nonaka & Konno, 1998 , p.46)

Knowledge creation and sharing are thus not simple actions, but a number of different activities involving groups of people interacting in a variety of ways, which may or may not involve the use of information technology. The next step is to consider how to ensure that knowledge sharing is effective.

2.4 APPROACHES TO KNOWLEDGE SHARING

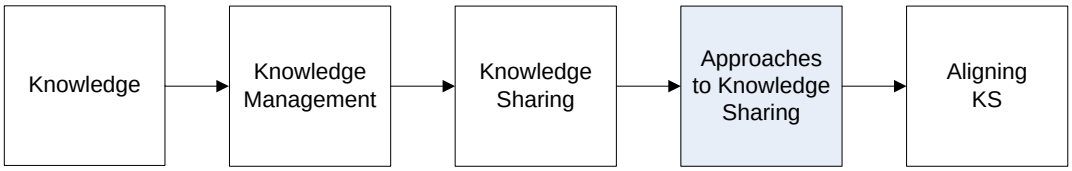

Figure 10: Literature Review Structure – Stage 4

Many areas impinge on the effectiveness of knowledge sharing and an understanding of this is an important part of knowledge sharing research (van den Hooff & de Leeuw van Weenen, 2004), thus this section will synthesize the literature in this area.

2.4.1 KNOWLEDGE SHARING IN THE ORGANIZATION

Studying knowledge management as related to new product development in Nortel, Massey et al. (2002) focussed on process, people and technology and examined managerial, resource and environmental influences. As new product development involves capturing new ideas, the initial process development was an opportunity to find out what sorts of knowledge employees needed and how that knowledge could be shared. The focus on people involved considering motivation to understand what was necessary to persuade employees to share. Technology based tools came last and were developed only after the needs were understood from the initial focus on process and people. Holsapple and Joshi (2000, 2002) developed a threefold framework for researching knowledge management which involved categorizing knowledge resources into 6 types, studying the activities required to manipulate knowledge and looking at the areas which influence knowledge management in the organization. In this last area,

they found the most significant to be resource influences, managerial influences and environmental influences. Massey et al. used this framework as a means of exploring the success of Nortel in knowledge management. Considering managerial influence, Massey et al. stressed the importance of aligning business strategy with KM strategy and emphasised the importance of considering knowledge as a process of flows rather than as an end product. In other words, the sharing of knowledge was more important than its basic existence. They summarised this section by saying 'Effective KM needs to address complex interrelationships among people, process, and technology in a balanced manner.' (Massey et al., 2002, p.283). Amongst resource influences, the research found the most important to be the motivation of the employees to share knowledge and to change their behaviours. Massey et al. define technology as one of the environmental influences and here, the important factor was driving the technology by the process for the benefit of the people – '*By understanding "what to do" (process) and human and knowledge resources (people) first, the […] team was able to more precisely specify technology use and requirements. Without this, technology may have only a random effect on performance*'. (Massey et al., 2002, p.285) They also found that successful knowledge management initiatives could not easily be disentangled from the wider issues of the organization and change.

Both Holsapple et al. and Massey et al. discuss management influences and the importance of top level leadership and support. Kotter (1995), discussing business change in general also details the significance of leadership. Emphasising this, Damodaran and Olphert (2000, p.412) suggest that KM projects will not succeed unless "*top managers 'walk their talk' and provide leadership by promoting/demonstrating knowledge sharing in practice*".

Others seem to agree with these ideas that there are many parts to knowledge management. Hariharan (2005), a practitioner, proposes '4 pillars of KM' – Leadership, culture and people; KM processes and technology; relevance to business and KM measurement, thus adding measurement to the areas discussed by Massey et al.

The structure of the organization may also help or hinder effective knowledge sharing:

> *'Organizational structures that promote* silo *behaviour, in which locations, divisions and functions are so focused on maximising their own accomplishments and rewards that they, consciously or unconsciously, hoard information and therefore suboptimize the total organization'. (O'Dell & Jackson Grayson, 1998, p157)*

Gold et al. (2001) make a similar point that trying to optimise knowledge sharing in a small business area can often be detrimental to sharing across the organization as a whole. They suggest a flexible organization that allows sharing and collaboration across boundaries. Various structures have been suggested and two that have been considered good for knowledge sharing are a modular approach suggested by Sanchez and Mahoney (1996) and Nonaka and Tageuchi's (1995) hypertext organization which involves a hierarchical business systems layer and 'task force' project teams supported on a 'knowledge base'. However Oliver and Montgomery (2000) argue that the optimal structure will not necessarily be the same for every knowledge-intensive firm and most agree that flexibility is key.

Like Massey et al. mentioned earlier, Allweyer (1999) notes the need for a knowledge strategy. He suggests this should tie into the organizational strategy by capturing the company's strategy, objectives, critical success factors, and environment. 'Based on this information, strategically important fields of knowledge can be defined, and important knowledge-intensive business processes and activities can be determined' (Allweyer, 1999, p.11). Massingham (2004) discusses the need to link business level strategy with knowledge resources because 'knowledge only becomes valuable if it is used to create superior capability in an activity that is valued by customers' (Massingham, 2004, p.52).

Many scholars discuss the interaction of knowledge management and culture. Ardichvili et al. (2003) comment that a supportive organizational culture is a prerequisite for knowledge sharing and that once employees all feel that knowledge is a 'public good' belonging to the whole company, knowledge begins

to flow easily. This is supported by Jasimuddin, Connell and Klein (2006) who examined the high level of knowledge sharing in IBM and found that

> *"people engage in knowledge transfer for six reasons:*
>
> *(i) Because jobs are interrelated — no one can do his (her) job without others' technical help;*
>
> *(ii) reciprocity — helping today to get others' help in future;*
>
> *(iii) to save time;*
>
> *(iv) to build social networks;*
>
> *(v) to achieve career advancement; and*
>
> *(vi) organizational loyalty."*
> *(Jasimuddin et al., 2006, p.6)*

Many of these involve building a level of trust and an understanding of how trust works in the organization is important. The idea of trust is also taken up by Scarbrough (2003) in a study of behaviours that effect knowledge sharing where he discusses four specific behaviours and how to encourage them. The first he calls 'Knowledge web' which is where social networks connect people by their knowledge and this can be improved using communities of practice to facilitate sharing. Next is the 'Knowledge ladder' which suggests that knowledge is shared in an effort to maintain or improve status and this is facilitated by creating an environment where knowledge sharing is valued. Next comes the 'Knowledge torch' which emphasises the importance of leadership and role models and finally, 'Knowledge fortress' where knowledge is felt to be a source of protection or power and which can be mitigated by building trust across departments with cross-functional teams. This last is seen to be particularly important by Chan and Garrick (2003) who say that for many people, knowledge **is** power so why should they share. Scarbrough's ideas (especially the knowledge ladder) also involve motivation. Theories of motivation fall into two broad categories. *Content* theories emphasise the reasons for motivated behaviour and/or what causes it. Some of the better known are Maslow's Hierarchy of Needs (Maslow, 1943), McClelland's Acquired Needs theory (McClelland & Burnham, 1976) and Herzberg's Two-factor theory (Herzberg, Mausner, & Snyderman, 1967). *Process* theories try to provide an understanding of the cognitive processes that influence

people's behaviour – examples are equity theory (e.g. Mowday, 1987) and expectancy theory (Vroom, 1964). Scholars have amalgamated these together in various ways (e.g. Schermerhorn, Hunt, & Osborn, 1991) and, in general, motivation is going to be influenced by extrinsic (e.g. pay) and intrinsic (e.g. recognition, satisfaction, etc) rewards. (Extrinsic motivation implies an indirect satisfaction of needs, usually by monetary means whereas intrinsic motivation involves immediate satisfaction and is valued for its own sake.) Osterloh and Frey (2000) stress the importance of having both intrinsic as well as extrinsic motivation to encourage knowledge sharing.

Reimus summarises the importance of culture, motivation and behaviours saying

> *'when it comes to sharing information … a majority of the firms agreed that their leading challenge had comparatively little to do with information or technology … and everything to do with changing behaviour' (Reimus, 1996, p.24).*

Business processes can also be related to knowledge sharing. Disterer (2001) suggests that strongly bureaucratic and administrative organizations can have overly formal processes which prevent the transfer of knowledge and new ideas as can language barriers and a desire to avoid conflict. Davenport et al. (1996) comment on the difficulty of applying a traditional process approach to knowledge work due to its nature as unstructured, individualised and lacking in separation among processes, inputs and outputs. They suggest that processes should cover the acquisition, creation, packaging, application and reuse of knowledge. Other researchers have proposed alternative approaches to knowledge processes. Allweyer (1999) looks at how business processes are used in different ways when business process reengineering (BPR) or knowledge management are applied.

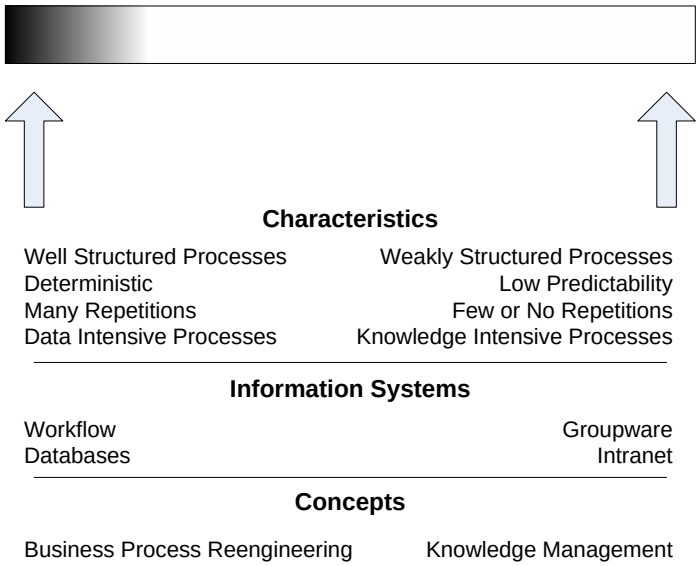

Table 3. Different types of process
(Allweyer, 1999, p.3)

As Table 3 shows, there is not a clear distinction between these two types of process despite their different characteristics and related information systems, and many will fall between the two extremes. Allweyer goes on to develop a combined approach based on five different types of knowledge process: knowledge procurement, knowledge presentation, knowledge transfer, knowledge utilisation and knowledge removal. This leads to a model for knowledge process redesign involving knowledge process design, knowledge process management, knowledge process control and knowledge process application. Coakes, Bradburn, & Sugden (2004) study process knowledge in organizations and suggest that there are six processes relevant to knowledge and these are surfacing, capturing, codifying, distributing, leveraging and measuring the value of knowledge. Maier and Remus (2003) explore process-oriented knowledge management strategies, emphasising the need for a strategic input to any knowledge management processes. It is thus possible not only to have processes *for* knowledge sharing, but also processes that may *affect* knowledge sharing either positively or negatively.

Fundamental to knowledge sharing is communication. This is particularly true of tacit knowledge. Some people are capable of giving excellent explanations of

their experiences and others are not, thus "*Tacit knowledge is a function of individual eloquence*" (Kalling & Styhre, 2003 p.66) and "*knowledge is distributed and shared through what may be regarded as everyday speech*" (Kalling & Styhre, 2003, p.68). Communication may be face-to-face, either formal as in meetings or informal 'round the water cooler', or it may be computer mediated utilising email, websites or databases (Goodwin, Vidgen, & Powell, 2003) but it is fundamental to sharing knowledge. Storytelling can be a particularly effective way of communicating to share knowledge in organizations (e.g. Denning, 2001; Gabriel, 2000).

Another approach to encourage communications for knowledge sharing is the use of Communities of Practice (CoPs). The concept of CoPs as an aid to knowledge sharing arose during the 1990s. The first formal definition of a CoP was that of Wenger (1998) who considered it a group that cohered through 'mutual engagement' on an appropriate enterprise and had a common repertoire. Although this was the first time a CoP had been defined, they had been considered earlier by a number of scholars, notably Lave and Wenger's (1991) discussion of situated learning and Brown and Daguid's (1991) stressing of CoPs role in the improvisation of new understanding in an organizational setting.

Wenger et al. (2002) then focused on the value of CoPs as a management tool and redefined them as 'a group of people who share a concern, a set of problems or a passion about a topic and who deepen their knowledge and expertise in this area by interacting on an ongoing basis' (Wenger et al., 2002, p.4). This is a significant change from his earlier definition:

> *'the prescription for management is not about making space for workers to appropriate a joint enterprise, as was implied in Wenger's earlier book; rather the idea is to create or foster new groupings of people who work on similar or parallel, not joint, enterprises (practices), effectively to invent new practices' (Cox, 2005, p.534).*

CoPs can be characterised by three structural elements (Create communities of practices, 2008; Wenger et al., 2002):

The *knowledge domain* creates common ground and inspires members to participate. The *community* provides the social context where knowledge sharing

and learning can take place. A strong community improves relationships based on trust and respect. The *practice* is the set of ideas, styles and frameworks that the community develops to share and maintain knowledge.

Although organizations cannot make a CoP happen, they can create an environment to encourage them and help them grow (Lesser & Prusak, 2000; Wenger & Snyder, 2000). McDermott (1999) argues that it is communities that promote knowledge sharing and that although it is the capabilities of information systems that have fuelled a desire for knowledge sharing, it actually takes human beings to realise it. He emphasises that information technology is only one of four challenges faced in building efficient, knowledge sharing communities. He describes these as the technical challenge of making information available; the social challenge of building diverse, thinking communities; the management challenge of creating a culture and environment that encourages knowledge sharing; and the personal challenge of being open to ideas and being prepared to share them.

CoPs can bring benefits – short and long term - both to individuals and to the organization and these are summarised in Table 4.

	Short-term value	Long-term value
	Improve business outcomes	*Develop organizational capabilities*
Benefits to Organization	Problem solving	Strategic capabilities
	Time saving	Keeping abreast with competition
	Knowledge sharing	Innovation
	Synergies across units	Retention of talents
	Reuse of resources	Retention of talents
	Rapid response to client needs & inquiries	
	Prevention of 'reinventing the wheel'	
	Improve experience of work	*Foster professional development*
Benefits to Members	Help with challenges	Retention of talents
	Access to expertise	Reputation
	Confidence	Professional identity
	Fun with colleagues	Network
	Meaningful work	Marketability
	Sense of belonging	
	Decreased learning curve	

Table 4: CoPs Benefits

Developed from (Lesser & Prusak, 2000; Vanasse & Poynton, 2003; Wenger et al., 2002)

Although CoPs share many common characteristics with teams, they are not the same thing (Katzenbach & Smith, 1993; Lesser & Storck, 2001; Vanasse & Poynton, 2003). Teams will often use CoPs by passing questions and problems to them and subsequently receiving solutions or innovations. However it is important to recognise that their purposes are distinct and separate.

2.4.2 KNOWLEDGE SHARING AND INFORMATION TECHNOLOGY

The importance of information technology in knowledge management is emphasised by the amount of KM research originating in the IS/IT areas. Swan and Scarbrough analysed KM articles by profession and the results are shown in Figure 11.

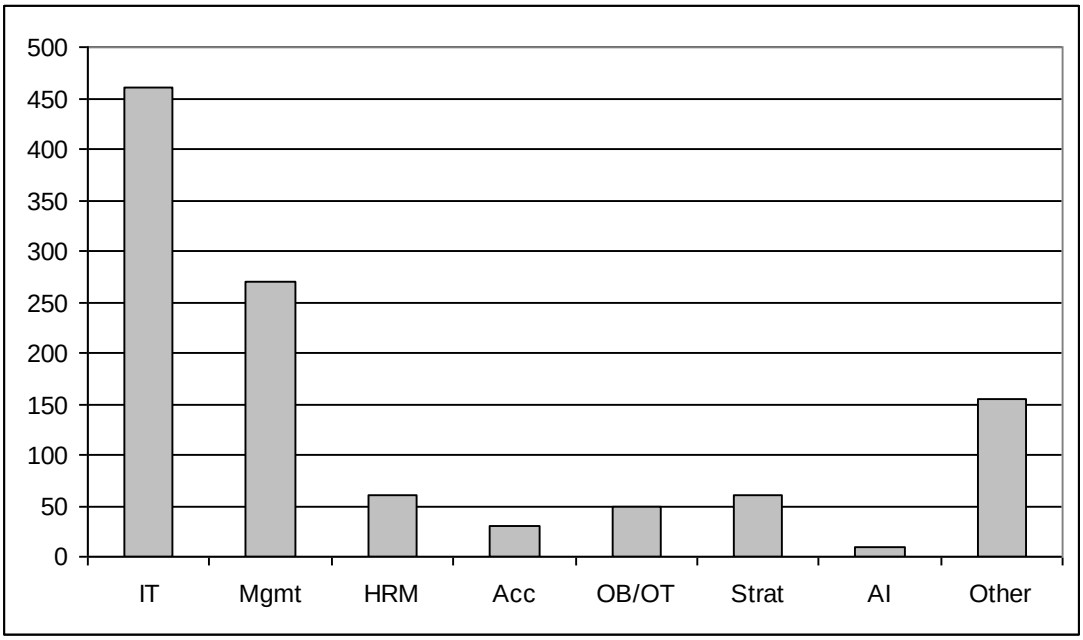

Figure 11: Total Number of Articles by Profession - 1990-2000
(Swan & Scarbrough, 2002)

The rest of this section will concentrate on the large majority of the literature from the IT and general management areas. This is not to belittle the contribution of those other disciplines (for example, "*the entire HRM process should be re-oriented towards the management of human knowledge resources*" (Brauner & Becker, 2006, p.68), however this researcher's background in the IS area and his 'home' in an IS research group would seem to make this a sensible approach.

This research covers many areas. Damsgaard and Scheepers (2001) look at the use of intranet technology for improving knowledge creation and sharing within the organization. They develop a framework based on Nonaka's knowledge creation framework. They argue that Nonaka's socialization stage, although traditionally considered to be largely dependent on physical proximity, can be strongly facilitated by electronic means that provide interaction such as discussion forums. Nonaka's externalization stage – turning tacit knowledge into codified forms – maps across to using the intranet for recording information, while in the combination stage the mode is that of searching. This may involve simple hyperlink-based navigation or the use of complex search engines. Finally, they see internalization happening through transactions with intranet-based knowledge repositories. (Figure 12)

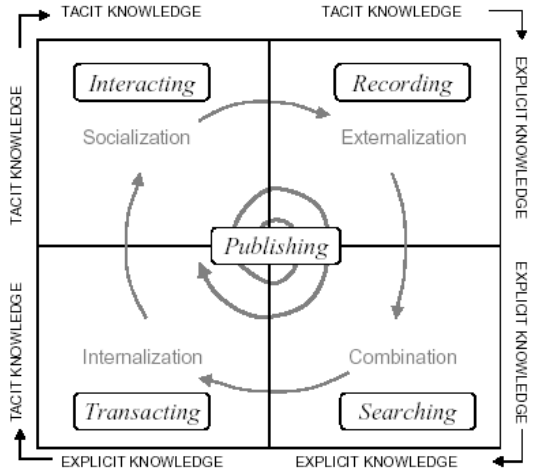

Figure 12: The SECI Model and Intranets.
(Damsgaard & Scheepers, 2001, p.681)

Thus they see information technology as relevant to all stages of knowledge creation and sharing.

Hansen et al. (1999) consider two approaches to knowledge management strategies. The first, which they call codification strategy, involves codifying knowledge and storing it in databases where it can be utilised easily by anyone in the company. In the second approach, knowledge is tied closely to individuals and shared mainly through person to person contacts which may be supported by technology. They call this the personalization strategy. Hansen et al. believe that an organization should consider both strategies but focus on one – an 80/20 approach. Scheepers et al. (2004) find some support for this argument but suggest that the mix may well have to change over time. This personalisation/codification approach was been followed by many researchers but later research has suggested that the two extremes need to come together with 'bridge the gap' knowledge sharing. A comparison of the approaches is given by Maier et al. (2003) – See Table 5.

Dimensions	Technology-oriented KM	Human-oriented KM	''Bridging the gap'' KM
1 - Approach			
Orientation	Technology-oriented	Human-oriented	Process-oriented; knowledge processes integrate both orientations
Perspective	Engineering, cognitive	Cultivation, community	Socio-technical systems engineering
Definition of knowledge	Documented knowledge, separable from people	Knowledge exclusively in the heads of people	Documented knowledge is connected to knowledge in the heads of people and embedded in social networks according to (knowledge) processes
2 – Strategy			
KM strategy	Codification	Personalization	Boundary spanning
Goals	Improve documentation and retention of knowledge, acquisition of external knowledge, turn implicit into explicit knowledge	Improve communication, training of newly recruited, improve knowledge sharing, improve personnel development	Improve visibility of knowledge, improve access to and use of existing tacit and explicit knowledge, improve innovation, change culture
3 - Organization			
Roles	Author, knowledge (base) administrator, knowledge broker	Knowledge worker, expert, mentor, network chair, community manager, moderator	Knowledge partner and stakeholder, boundary spanner, coordinator for KM, subject matter specialist, owner/manager of knowledge processes
Tasks	Storing, semantic release and distribution, refinement, deletion/archiving of knowledge, acquisition of external knowledge	Establish, foster and moderate communities, document skills and expertise, organize knowledge sharing events	Develop knowledge maps connecting knowledge elements and people, develop profiles, develop knowledge portals, personalize organizational knowledge base
Culture	Technocratic	Socio-cultural	Socio-technical, discursive

Dimensions	Technology-oriented KM	Human-oriented KM	''Bridging the gap'' KM
4 - KM instruments and systems			
Instruments	Document and content management	Skill management, knowledge communities, knowledge networks	Knowledge maps, lessons learned/best practice management, continuous improvement
Contents	Knowledge about organization, processes, products; internal studies, patents, on-line journals	Employee yellow pages, skills directories, directories of communities, knowledge about business partners	Ideas, proposals, lessons learned, best practices, community home spaces, valuations, comments, feedback to knowledge elements
Architecture	Integrative KMS	Interactive KMS	KMS bridging the gap
Functions	Publication, classification, formalizing, organization, search, presentation, visualization of knowledge elements	Asynchronous and synchronous communication, collaboration and cooperation, e-learning, community support	Profiling, personalization, contextualization, recommendation, navigation from knowledge elements to people
5 – Economics			
Evaluation area	Content, integrative KMS	Communication, social networks, interactive KMS	Knowledge process, content, communication, KMS bridging the gap
Evaluation categories	System quality, information and knowledge quality, use, user satisfaction, impact on individuals	Communication quality, knowledge-specific services, use, user satisfaction, impact on collectives	All evaluation categories

Table 5: KM Approaches

Adapted from (Maier & Remus, 2003, p.64)

The codification approach particularly assumes (as do Damsgaard & Scheepers) that information systems can store knowledge. Galliers and Newell (2001) take a different approach and argue that information technology cannot manage knowledge at all – only data. They argue, 'the real challenge is to promote the notion that what can be transferred and shared using information technology is not knowledge, not even information, but data' and go on to support the idea of a transdisciplinary approach to research in these areas involving both information technology and organizational behaviour. However, in investigating organizations that have implemented ERP, they mention that the benefit from their IS 'is measured in terms of improved communication, knowledge sharing and knowledge creation, and innovation' which suggests that organizations

certainly perceive that their IS can have a positive effect on knowledge management – or at least on data sharing. Pfeffer and Sutton (1999) support this, arguing that despite the huge amounts of money invested by organizations in knowledge management groups, most knowledge is actually transferred and used by trial and error, by storytelling and by the close interaction of the less experienced and the more experienced.

The codification/personalisation approach is also described as a divide between technology-oriented KM and human-oriented KM, with some scholars (e.g. Maier & Remus, 2003) stressing the need for an in-between 'bridging the gap' approach.

The dichotomy of tacit-explicit knowledge has been mentioned earlier. Tacit knowledge is hard to express in words or to codify whereas explicit knowledge is regarded as objective and codifiable (Blackler, 1995). There thus follows an implication that while information technology might not be able to do very much with tacit knowledge, sharing of explicit knowledge should be straightforward. Some scholars, also discussed earlier, see the tacit-explicit division as a continuum rather than as two discrete types of knowledge. Hislop (2002) builds on this and says that

> *"all knowledge (whether in the form of highly tacit skills or partially explicit knowledge) is deeply embodied, is embedded in the practices and activities that people undertake, is subjective in character, is to some extent socially constructed and is embedded in the social values and cultural contexts of those who develop and use it." (Hislop, 2002, p.174)*

He argues that as a result of this, the sharing of any knowledge using information technology is "somewhat problematic". However, even if IS cannot store knowledge and thus cannot 'do' knowledge management, it can facilitate and support it. Information systems can be used to create data repositories, improve data and information access or enhance the knowledge environment by, for example, the use of intranets, discussion forums, search engines and data repositories.

2.4.3 KNOWLEDGE SHARING EVALUATION

Any discussion of effectiveness cannot ignore the areas of evaluation and measurement as without the latter, there can be no real measure of effectiveness.

The literature on evaluation in knowledge management is sparse. One major reason is that it is difficult to measure the business benefits of knowledge management (e.g. de Gooijer, 2000; Van Buren, 1999) and as a result 'Few organizations have developed a set of indicators for KM measurement' (Holsapple & Joshi, 2002, p.60).

One common approach involves the concept of intellectual capital. 'Intellectual capital has been considered by many, defined by some, understood by a select few, and formally valued by practically no one' (Bontis, 1998, p.63). It has been simply defined as 'all intangible resources' (Bontis et al., 1999), meaning that part of the total value of the firm that is left after deducting financial capital. Handy (1989) comments that the intellectual capital value of most organizations are worth three to four times their book value. Intellectual capital has been variously subdivided, commonly into Human Capital and Structural Capital. Edvinsson and Malone (1997) define human capital as 'the combined knowledge, skill, innovativeness, and ability of the company's individual employees to meet the task in hand' and structural capital as 'everything left at the office when the employees go home'. (Edvinsson & Malone, 1997, p.11).

Turning now to the evaluation of knowledge as an intangible asset, Bontis et al. (1999) found that approaches fell into four main areas: human resource accounting, economic value added, balanced scorecards and intellectual capital. They concluded that while all these approaches have their success stories, no one tool is right in all situations. Sveiby (2002) proposes four similar methods for measuring intangibles: direct intellectual capital methods, market capitalization methods, return on assets methods and scorecard methods. Again, he suggests there is no one correct approach and that the methods offer different advantages.

Success factors must also be considered as these will give an indication of what must be evaluated. DeLone and McLean (1992) developed a model for information system success factors. Maier (2002) takes the DeLone and McLean model and expands this for knowledge management. (Figure 13)

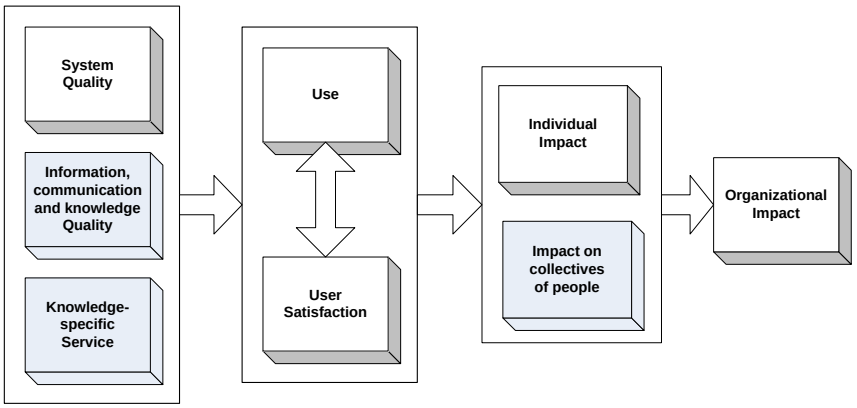

Figure 13: DeLone and McLean Model Expanded for KM.
(Maier, 2002, p.254) The shaded sections are the additions to the original model.

'Information, communication and knowledge quality' is added because knowledge management systems differ from IS with respect to the context of knowledge. The original 'information quality' was extended to include knowledge quality and as communications is vital to knowledge sharing, communication quality too was added. 'Knowledge-specific services' was added to find out to what extent specific roles exist that support knowledge management systems users in utilising the organization's knowledge base. Collectives of people are the most vital organizational group for developing and sharing knowledge. Hence 'Impact on collectives of people' is added. (This is very similar to the later version of the model from DeLone and McLean (2002).)

Martin (2000) surveyed measurement in knowledge management programmes and found that 'Any attempt to measure intangibles is fraught with dangers' commenting that different stakeholders may employ different measures for the same activity leading to confusion and an inability to make comparisons. He concludes that there is no one set of measures applicable to every company and even within a company, the relevant measures may change with time and circumstances.

Kalling (2003) reviewed empirical studies into knowledge sharing and found that almost all focussed on whether sharing had been accomplished. Very few considered whether the sharing resulted in any performance improvement.

Kalling also stressed that not all knowledge in organizations is useful or valuable. Knowledge within an organization "*not only includes useful and strategic information about markets, competitors and products, but equally includes old justified beliefs, outmoded ideas, and other forms of knowledge that are no longer regarded as useful*". (Kalling & Styhre, 2003 p.56) The sharing of outdated or incorrect knowledge can thus have a negative effect on the organization.

It is clear from the forgoing discussion that the success or otherwise of knowledge sharing is considered to be affected by many areas including culture, technology, leadership, business processes, strategy, measurement, corporate structure and management support. It is thus a socio-technical area of study involving not only the above areas, but also how they relate to one another – how they fit, or align.

2.5 ALIGNMENT

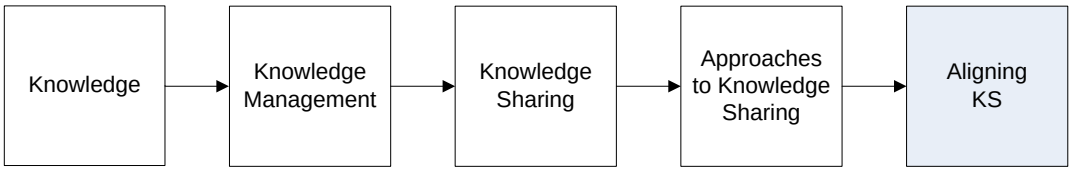

Figure 14: Literature Review Structure – Stage 5

Miles and Snow (1984, p.11) suggest that fit is "*a dynamic search that seeks to align the organization with its environment and to arrange resources internally in support of that alignment*." There are thus two sides to fit, external and internal. External fit is where the particular area's 'structure, systems and management practices' must fit with the way the organization currently works. (e.g. Goold & Campbell, 1987; Kimberley, Miles, & Associates, 1980). Internal fit is where all these areas complement and support one another. For example, Woodward (1965) suggests that the success of a firm is affected by how well human resources, structure and

technology support each other and fit with each other and Leavitt (1965) looks at the need for people, structure, technology and tasks to fit together.

This section was entitled 'Alignment', but so far, the term used has been 'fit'. This is an indication of the varying nomenclature used by researchers in this area. Although the term 'alignment' is used by many researchers, so is 'fit', 'linkage' (e.g. Henderson & Venkatraman, 1989) and 'bridge' (e.g. Ciborra, 1997).

The concepts of fit have been examined in a number of areas. Baird and Meshoulam (1988), for example, looked at fit in human resource management. However, the literature on alignment in the area of knowledge management appears sparse. Brockway (1996) discusses the importance of 'knowledge technologies' to business alignment but makes no mention of anything except technology. Cavaleri (2004) emphasises that knowledge management is more than just technology and looks at the alignment of KM and organizational learning and Shih and Chiang (2005) look at alignment between HRM strategy, KM strategy and corporate strategy. On the other hand, alignment literature is most prolific in that other socio-technical area, information systems:

> *"The IS literature repeatedly outlines the fundamental importance of alignment for organizational effectiveness. Furthermore, studies have demonstrated that IS alignment and performance are correlated." (Chan, 2002, p.98).*

Efforts to achieve alignment between IS and the business have been taking place since the early 1970s. Initially, top-down strategic planning models were developed to align business strategy with IS investment. For example:

> *The MIS Strategic Planning process involves the identification and assessment of an "Organizational Strategy Set" - an informational set which delineates the organization's mission, objectives, strategies, and other strategic attributes. This set can be transformed into another information set,*

> *an "MIS Strategy Set," which delineates system objectives, constraints, and design strategies. (King, 1978, p.36)*

The drivers in this period were to align business and IS strategies while considering the effect of IS on business strategies. (e.g. Earl, 1989) At the same time, the importance of structural alignment was being considered which looked at the structural fit between IS and the organization. For example:

> *The major implication of this study for organizations arises from the relative consistency in association between organizational size, organizational structure, and MIS structure. Since this consistency is found in organizations, all of which have successful MIS, it follows that different MIS structures naturally fit different organizational contexts. Organizations would be well advised to be aware of this conjunction of organizational and MIS modalities. Both organizations and implementers of MIS should know the risks they run if they attempt to challenge this relationship with organizationally inconsistent MIS structures. (Ein-Dor & Segev, 1982, p.66)*

Moving from a static to a dynamic approach, Henderson and Venkatraman (1989, 1993) developed a strategic alignment model consisting of two parts: *strategic integration* between business and IT strategy and *operational integration* involving architecture, skills and processes. There are thus four domains involved – Business strategy, IT strategy, organizational infrastructure and processes and IS infrastructures and processes – and cross-domain relationships are needed if alignment is to be achieved; and they discuss the four main perspectives which cover both internal and external fit.

Henderson and Venkatraman were involved in the MIT90s study (Scott Morton, 1991) which developed a framework for studying alignment. (Figure 15) This framework ties together culture (Structure, management processes, individuals and roles), strategy and technology along with the external socioeconomic and technological environments and has been used for studying a number of areas including internal alignment (e.g. Yetton, Johnston, & Craig, 1994) and organizational change (e.g. Yetton & Sauer, 1997).

These alignment models are based on the assumption that business and IS strategies are separate entities (Sauer & Burn, 1997) and some studies have

suggested that this in itself can be a cause of misalignment. More recent research has focussed on the enablers of alignment in ever more dynamic environments.

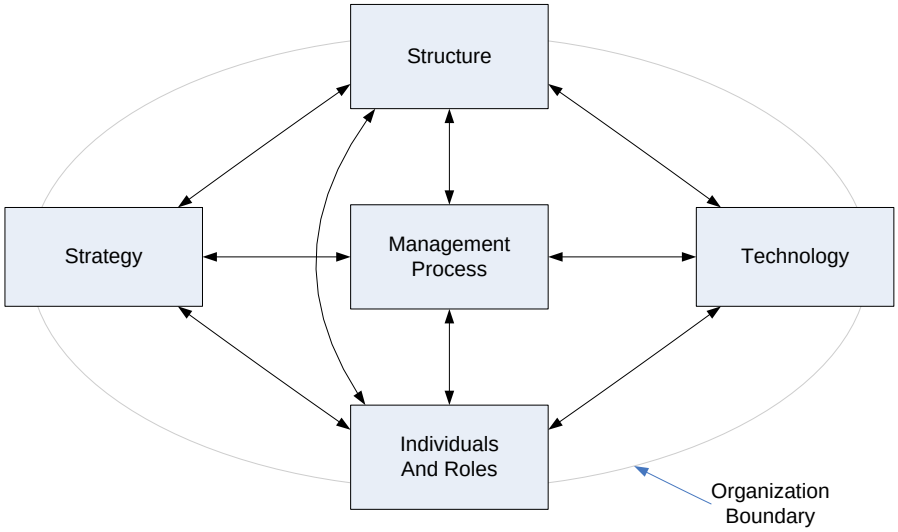

Figure 15: MIT90s Framework
(Scott Morton, 1991, p.20)

Earl (1993) found that continuous integration between IT and the rest of the organization gave the best alignment results and the positive effects of informal networks and relationships have been emphasised (Chan, 2002).

Alignment has remained a source of major interest to IT executives as well as to academics. In a report on key issues for executives (Luftman, 2006) it ranked first as it had done for the previous two years.

The importance of the alignment of KM strategy with corporate strategy was mentioned earlier (e.g. Allweyer, 1999; Massey et al., 2002; Massingham, 2004) and Avison et al. say

> *"Alignment is seen to assist a firm in three ways: by maximising return on IT investment, by helping to achieve competitive advantage through IS, and by providing direction and flexibility to react to new opportunities." (Avison et al., 2004, p.225)*

and this thesis will enquire as to whether this statement can be equally true if the references to information systems are replaced by ones to knowledge management.

2.6 DEVELOPMENT OF THE RESEARCH QUESTION

2.6.1 LITERATURE REVIEW SUMMARY

There is a consensus that the differentiating factor between information and knowledge is human intervention (e.g. Alavi & Leidner, 1999; Davenport & DeLong, 1998; Nonaka, 1994; Vance, 1997). The implication of this is that while information systems can contribute to knowledge sharing and management, they cannot *do* it (e.g. Galliers & Newell, 2001; Scruton, 2007; Thompson & Walsham, 2001). (Computers can, however, 'do' data and information management which are a prerequisite of knowledge management.) Similarly, knowledge creation and sharing require interaction between people in a number of different ways (e.g. Nonaka, 1994; Nonaka & Konno, 1998). This thesis thus takes the view that knowledge comes from individuals, and so to build organizational knowledge, organizations need to create and support an environment where individuals can create and share knowledge.

The literature on knowledge management shows a wide variety of definitions (e.g. Bollinger & Smith, 2001; Soliman & Spooner, 2000; von Krogh, 1998 and many others) but one common factor amongst them is the need for knowledge sharing. It then becomes clear from studies into knowledge sharing effectivness that a number of factors can help or hinder including strategy (Allweyer, 1999; Massingham, 2004), communications (Kalling & Styhre, 2003; McDermott, 1999), organizational structure (O'Dell & Jackson Grayson, 1998), culture (Ardichvili et al., 2003; Disterer, 2001; Scarbrough, 2003) and processes (Allweyer, 1999; Coakes et al., 2004; Davenport et al., 1996). Communities of practice are seen as a particularly effective approach to promoting knowledge sharing bringing both short- and long-term benefits to the organization (e.g. Lesser & Prusak, 2000; Wenger et al., 2002). Many knowledge sharing studies considered whether knowledge sharing actually took place rather than whether it brought any benefit to the organization (e.g. Kalling & Styhre, 2003). This was emphasised by a review of evaluation in knowledge management that found considerable evidence that many organizations do not evaluate knowledge management projects well, if at all (e.g. Bontis, 1998; Holsapple & Joshi, 2002; Martin, 2000). One of the main reasons for this is that it is not easy to do,

primarily because of the intangible nature of the many possible benefits. There is a consensus that despite the difficulties, evaluating the benefits of knowledge management is important and that the evaluation of intangibles is part of this (e.g. Bontis et al., 1999; Maier, 2002; Sveiby, 2002). There is less consensus on **how** this should be done.

Knowledge sharing and creation involve not only technology but also communications between people, supportive cultures and processes, organizational structure and a guiding strategy. It is thus an area of socio-technical study and it is clear that any study of the factors that enable and constrain knowledge sharing must consider all of these areas.

Alignment (or 'fit'), specifically internal alignment (e.g. Leavitt, 1965; Woodward, 1965) looks at how all these areas fit together to support the organization. There is little relevant literature on alignment as related to knowledge sharing, however alignment has been studied extensively in the information systems area. Initially this was concerned primarily with aligning business and IS strategy (e.g. Earl, 1989; King, 1978). Later, the areas studied expanded to include processes, skills and structures (e.g. Ein-Dor & Segev, 1982; Henderson & Venkatraman, 1989). Over the last decade or so, both theoretical and empirical evidence that successful alignment is beneficial to organizations has grown (e.g. Chan, 2002; Earl, 1993; Luftman & Brier, 1999; Weill & Woodham, 2002). In addition, alignment remains high on the agenda of practicing IS executives (Luftman, 2005, 2006).

2.6.2 RESEARCH QUESTION

It is knowledge sharing within organizations that is of concern and, more specifically, what enables and constrains knowledge sharing.

The literature review has shown that knowledge sharing is affected by a number of factors including strategy, technology, processes, structure and behaviours. These factors have also been shown to be relevant to the success of information systems in organizations and this has led to the use of alignment theories and practices which have been found beneficial.

If information systems and knowledge sharing are both subject to similar factors and if alignment of these factors is seen as beneficial to information systems, then it can be argued that the applicability of alignment to knowledge sharing should be considered. Chan also suggests that ways of improving alignment can be found by asking three questions: "What key components of IS alignment clearly impact IS performance? What aspects of IS alignment are less well understood? What managerial practices improve the probability of alignment?" (Chan, 2002, p98) – these questions can be asked of KS just as well as of IS.

This leads to an initial research question of 'What factors enable and constrain knowledge sharing in organizations and what is the relevance of alignment'?

As mentioned earlier, the MIT90s framework (Scott Morton, 1991) has been used as a schema to investigate internal alignment (e.g. Yetton & Sauer, 1997) and so this has been chosen as a theoretical framework for this research (Figure 16).

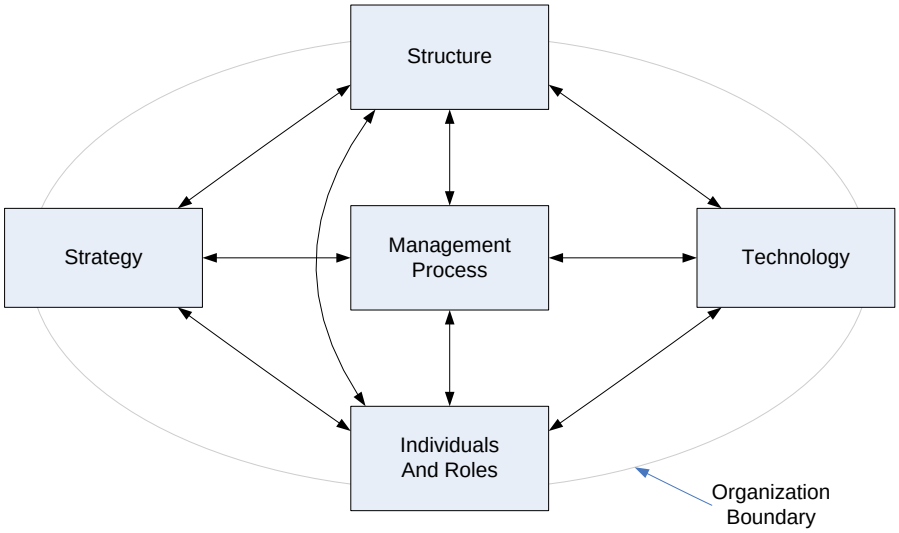

Figure 16: Research Framework
(Scott Morton, 1991 p.20)

This framework suggests that "*an organization can be thought of as comprised of five sets of forces in dynamic equilibrium among themselves even as the organization is subjected to influences from an external environment*" (Scott Morton, 1991, p.20).

Alavi and Leidner (1999) found three different perspectives of knowledge management in a survey of senior managers. Their information-based perspective was about using information and knowledge. Their culture-based perspective was concerned with organizational learning and communications and the technology-based perspective with the use of technology. These can be mapped to the different areas of the model as shown in Figure 17 where solid lines indicate a direct mapping and dotted lines a secondary one.

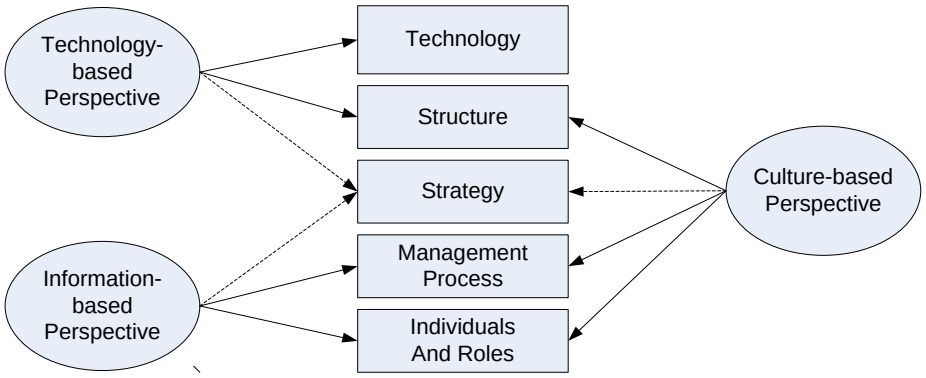

Figure 17: Mapping of Alavi et al. research to the Research Framework

Considering Holsapple and Joshi's (2002) three major external influences, their 'resources' maps to the Individuals and Skills box; their 'management influence' to Structure and Management Process and their 'environment' to the External Environment. Gold et al's (2001) knowledge infrastructure and knowledge process architecture also maps to the right hand four boxes of the framework and Damsgaard and Sheepers (2001) review of intranet usage maps to the technology box. McDermott (1999) emphasises four challenging areas, technical, social, management and personal which again can be mapped to this model.

This basic framework is thus relevant to the areas discussed in the literature and the framework can thus be simply adapted for knowledge sharing as shown in Figure 18.

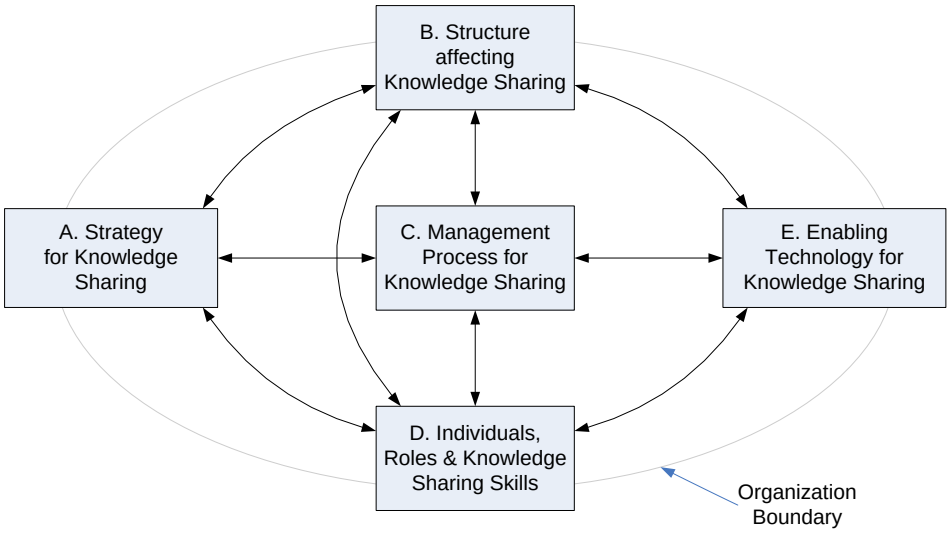

Figure 18: Research Framework for Knowledge Sharing

The value of this research will be partly in investigating what promotes and inhibits knowledge sharing in real life and partly in investigating alignment in knowledge sharing – is effective alignment required for effective knowledge sharing and does misalignment inhibit knowledge sharing?

This chapter began by looking at how knowledge differs from data and information. It then considered definitions of knowledge, a number of which revolve around the idea of 'justified true belief', implying that computers cannot store knowledge. This led on to a consideration of knowledge management including its early development and its definitions, of which there are many – most of which involve knowledge sharing. Knowledge perspectives, especially the tacit/explicit dimension, were next reviewed. The importance of sharing knowledge was then discussed which led on to a consideration of the areas that enable effective knowledge sharing. These areas include strategy, structure, people, process and technology. Different approaches to the evaluation of knowledge sharing were also discussed. Next, the concepts of alignment and strategic fit were explored along with their relevance to knowledge sharing. Finally, the research question was developed and a theoretical framework for the

research was proposed. The next chapter will consider how the research might be undertaken.

3 RESEARCH PHILOSOPHIES, METHODOLOGIES AND METHODS

Different research methodologies involve a number of differing underlying philosophies, many of which are incompatible. Thus, before considering methodologies and methods in detail, this chapter first considers the background of the philosophy of science and then looks at the various philosophical perspectives of research and the paradigms and approaches that have developed over the last few decades. The chapter concludes by describing the research design in detail.

3.1 PHILOSOPHIES AND METHODOLOGIES

3.1.1 THE PHILOSOPHY OF SCIENCE

The philosophy of science is concerned with questions such as: How can we make a distinction between science and non-science? What procedures should scientists follow? How do we know that a scientific explanation is correct? What is the cognitive status of scientific laws and principles? (Smith, 2000). Detailed writing in this area began with the ancient Greeks, notably Aristotle (384–322 BC) who worked on the basis of inducing regularities in the world about him by inspection and then deducing from this some predictable outcome – an 'inductive-deductive' view.

Aristotle's approach was extended by Bacon (1214–1292) who introduced the idea of active experimentation albeit mostly from a 'see what happens' perspective. This 'inductivist' view has two crucial parts: *hypothesis follows observation* and *completely 'true', verifiable theories are possible*. This approach continued well into the 20th century when it came to be attacked by a number of philosophers, chief among them Popper (1902–1994) who suggested that science begins with an unproven theory and then compares its predictions with the result of observations to see whether it stands up to such a test. If not, then the theory is false. Alternatively, if the tests fit the theory then science will continue to uphold it 'not as proven truth, admittedly, but nevertheless as an undefeated conjecture.' (Grayling, 1995, p129)

Thus scientific theory is put forward as hypotheses which are then tested. When they are proved false, they are replaced by new hypotheses. This approach is called the 'hypothetico-deductive' view. There is a fundamental difference in these two approaches. The inductivist view implies that we collect facts and make unbiased observations whereas the hypothetico-deductive view suggests that we interpret observations in the light of our hypotheses, theories and preconceptions.

Kuhn (1922–1998) agreed with Popper in terms of science being a problem-solving activity, which could not prove the absolute truth of something, but he disagreed about the dividing lines between science and non-science and about the role of falsifiability. He developed the idea that one accepted paradigm directed most research investigation until some 'revolutionary' research caused a significant paradigm switch. He also suggested 'Science is distinguished from non-science by being a problem-solving activity with an accepted paradigm' (Smith, 2000, p15). Lakatos (1922–1974) advanced a compromise between the views of Popper and Kuhn that tried to keep both Popper's ideas on scientific progress and Kuhn's views on how science actually changes. The philosophy of science continues to involve progress, argument and disagreement as it has done for some centuries – for example the current arguments over string theory (Woit, 2006).

3.1.2 PHILOSOPHICAL PERSPECTIVES FOR RESEARCH

One thing that becomes clear from reading the literature is an inconsistency in the usage of a number of terms especially *paradigms, methodology* and *methods*. The approach used in this thesis is as follows: All researchers have a set of abstract principles that will colour their approach. These combine beliefs about ontology (What is the nature of reality?), epistemology (What is the relationship between the researcher and the researched?) and *methodology* (How do we know the world or gain knowledge of it?). The overall grouping of the researcher's ontological, epistemological and methodological premises can be defined as a *paradigm*, or an interpretive framework, a 'basic set of beliefs that guides action' (Guba, 1990, p17). *Methods* are simply the research methods the researcher decides to use within their paradigm of investigation.

Researchers distinguish at least two philosophical assumptions for research deriving from the quantitative/positivist and qualitative/interpretivist traditions. The positivist tradition originated in the natural sciences and has since found its way into the social sciences. It tends to focus on laboratory-type experiments, numerical methods and surveys. The interpretivist tradition, on the other hand, was developed in the social sciences to allow researchers to investigate phenomena involving people. 'The motivation for doing qualitative research, as opposed to quantitative research, comes from the observation that, if there is one thing which distinguishes humans from the natural world, it is our ability to talk!' (Myers, 1997). Qualitative research is 'a situated activity that locates the observer in the world … [and] qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them' (Denzin & Lincoln, 2000, p3). Alternatively, 'qualitative research is an approach rather than a particular set of techniques, and its appropriateness derives from the nature of the social phenomena to be explored' (Morgan & Smircich, 1980, p491). In contrast, 'quantitative studies emphasize the measurement and analysis of causal relationships between variables, not processes, [and their proponents] claim that their work is done in a value-free framework' (Denzin & Lincoln, 2000, p.8). Qualitative research

methods are designed to help researchers understand people and the social and cultural contexts within which they operate.

Writers have contrasted these approaches in several dimensions to aid in understanding underlying assumptions and to develop a number of research paradigms. One such exposition of this is given in Table 6.

Assumption	**Question**	**Quantitative/ Positivist**	**Qualitative/ Interpretivist**
Ontological Assumption	What is the nature of reality?	Reality is objective and singular, apart from the researcher.	Reality is subjective and multiple as seen by participants in a study.
Epistemological Assumption	What is the relationship of the researcher to the researched?	Researcher is independent from that being researched.	Researcher interacts with that being researched.
Axiological Assumption	What is the role of values?	Value-free and unbiased.	Value-laden and biased.
Rhetorical Assumption	What is the language of research	Formal Based on set definitions Impersonal voice Use of accepted quantitative words	Informal Evolving decisions Personal voice Accepted qualitative words
Methodological Assumption	What is the process of research?	Deductive process Cause and effect Static design-categories isolated before study Context-free Generalisations leading to prediction, explanation, and understanding Accurate and reliable through validity and reliability	Inductive process Mutual simultaneous shaping of factors Emerging design-categories identified during research process Context-bound Patterns, theories developed for understanding Accurate and reliable through verification

Table 6: Research Paradigms.

(Creswell, 1994, p.5)

Taking an ontological view and looking at what is real, the positivist or quantitative researcher will look for things to measure objectively and independently of themselves while the qualitative researcher will accept that reality is constructed by all those involved in the research. On the

epistemological question of the relationship between the researcher and the researched, the quantitative approach sees the researcher as independent, controlling for bias and assessing findings objectively. Their qualitative colleague interacts with those being researched and tries to keep as close to them as possible. The role of values leads to axiological assumptions. The quantitative researcher keeps their values out of the study by the use of impersonal language and by concentrating on what they perceive as facts while the qualitative researcher accepts and reports their values and biases. Rhetoric – the language of research – can also be considered. Here the distinction is between impersonal and formal language on the one hand and more informal and personal on the other, using words like *understanding*, *discover* and *meaning* (Creswell, 1994). These distinctions lead to differing approaches to methodology.

Positivist research thus assumes an objective reality and measurable properties independent of the researcher. Positivist researchers often aim to test a theory. In contrast, interpretive researchers assume that access to reality is only through social constructions such as language and shared meaning. Taking information systems as an example, interpretive methods of research in IS are 'aimed at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context' (Walsham, 1993).

The two basic paradigms have been developed and extended in a number of ways. Several researchers add 'critical' (Orlikowski & Baroudi, 1991) - critical researchers accept that people can act to change their social and economic circumstances but that their ability to do so is restricted by the effects of political, social and cultural domination. The critical paradigm focuses on conflicts and contradictions in society.

Other researchers have proposed four paradigms. Burrell and Morgan (1979) looked at four debates: the ontological debate between the nominalist position of no 'real' structure to the world and realist approach of a real world made up of 'hard, tangible and relatively immutable structures'; the epistemological debate between positivism (which tries to 'explain and predict what happens in the social world by searching for regularities and causal relationships') and anti-

positivism where the social world is essentially relativistic; the 'human nature' debate between voluntarism (completely autonomous free will) and determinism (where activities are determined by the situation of the environment); and the methodological debate between ideographic theory (getting close to one's subject and studying its detailed background) and nomothetic theory (which is exemplified in the rigorous methods used in the natural sciences). They argue that all these debates can be analysed in two dimensions, the subjective-objective dimension and the dimension between what they term 'The sociology of radical change' and the 'sociology of regulation' – an 'order-conflict' dimension. In the former, the essence of the objectivist position 'is to apply models and methods derived from the natural sciences to the study of human affairs' (Burrell & Morgan, 1979, p7) while the subjectivist looks for understanding through the subjective experience of individuals. One end of the order-conflict axis considers a world characterized by order, consensus and stability while the other end moves towards conflict and coercion. They develop this into a matrix of four paradigms along two axes (Figure 19).

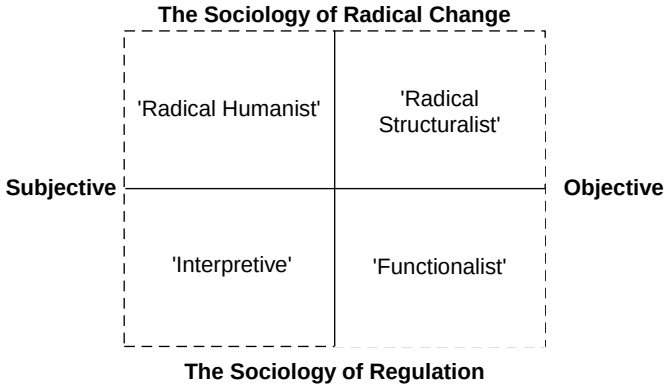

Figure 19: Four Debates.
(Burrell & Morgan, 1979, p22)

Although this four-paradigm grid had a widespread impact, it has its critics and has been developed and modified over time. Guba and Lincoln (1994) proposed positivism, post-positivism, critical theory and constructivism as their four paradigms. Lincoln and Guba (2000) added a participatory paradigm.

The next section will consider the development of these methodologies within the KM research community.

3.2 RESEARCH METHODOLOGIES IN KM

Conceptual papers in knowledge management have come from a number of areas including information systems (e.g. Alavi & Leidner, 2001; Grover & Davenport Thomas, 2001; Schultze & Leidner, 2002) and management (e.g. Davenport & Prusak, 1998; Deetz, 1996; Nonaka & Takeuchi, 1995). A survey by Peachey and Hall (2005) found 107 papers on knowledge management published between 2000 and 2003 in 14 top ranked IS Journals. Knowledge management research is thus in the mainstream of information systems research as well as being part of management research in general. Thus this thesis considers that much KM research has grown out of the IS area but both are fundamental parts of the management literature. See Figure 20.

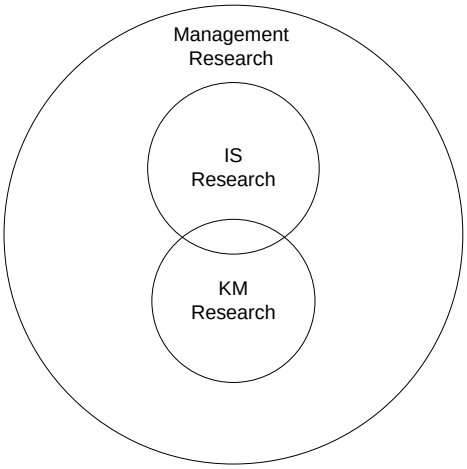

Figure 20: Relating KM research to IS and Management Research

As discussed in the literature review (Section 2.4), this is not to suggest that no other areas have contributed to research into knowledge management methodologies. However knowledge management and information systems are both socio-technical areas of research and the large amount of literature on IS methodologies and methods make it a fruitful and relevant area to consider. Initially, research methodologies within the IS community followed the general trends discussed previously and it is only more recently that a view has emerged that IS research is perhaps 'different' in many ways to mainstream management research. This is partly due to the origin of the IS community. For example, Banville et al. (1989) comment that academics have moved into the IS community from a variety of areas such as computer science, decision theory,

management theory, economics, psychology and others. In each case, the researcher would bring along concepts and methods from their own background.

It is possible to distinguish three phases in the history of the development of IS methodologies. Up until about 1988, the approach was largely positivist. The period from then until about 1995 has been described as the 'great debate' (Truex, 2001) over quantitative versus qualitative research. Walsham (1995a) looked at the emergence of interpretivism in IS research. He surveyed the major journals in the field and found evidence of increasing use of interpretivism and a decrease in the dominance of journals with a specifically quantitative philosophy. Finally, by about 1997, multiple epistemologies and ontologies began to be accepted (Markus, 1997).

Returning to the discussions on research paradigms in the preceding section, the approach of Burrell and Morgan (1979) has made its way into the IS arena (e.g. Hirschheim & Klein, 1989) and Deetz (1996) starts from these paradigms but considers that the dimensions used can obscure differences in research orientations and lead to poorly formed argument. He replaces the concepts of static paradigms with the more dynamic idea of discourses - Figure 21.

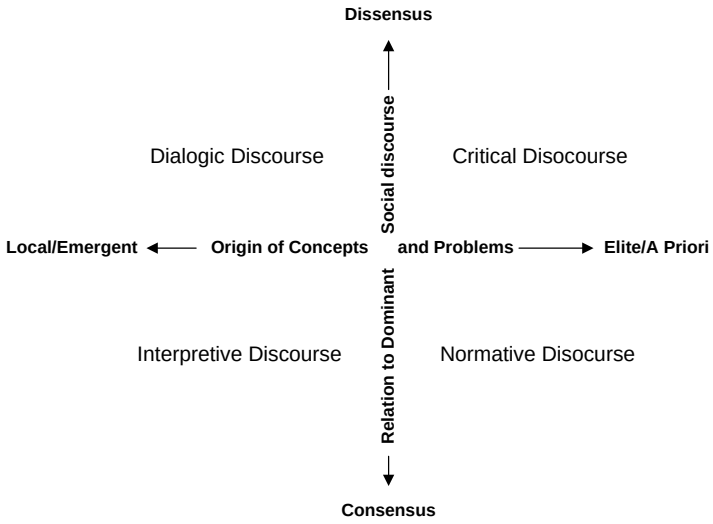

Figure 21: Research Discourses
(Adapted from Deetz, 1996, p.198)

According to Deetz, normative researchers focus on codification and looking for law-like relationships whereas with interpretive studies, "*the emphasis is on a social rather than economic view of organizational activities*." (Deetz, 1996, p.201). The critical discourse considers firms as sources of political conflict and struggle and looks at social order. Dialogic studies "*focus on the fragmentation and potential disunity in any discourse. Like critical studies, the concern is with asymmetry and domination, but unlike the critical studies' predefinition of groups and types of domination, domination is considered mobile, situational, not done by anyone.*". (Deetz, 1996, p.203).

Schultze and Leidner (2002) use Deetz's framework to classify knowledge management research (in the IS-related area) by analysing six journals over the period 1990-2000. Ninety-four articles relevant to knowledge management were found and the results of the classification are shown in Table 7 which suggests that both normative and interpretive approaches are widely accepted.

Dialogic Discourse	**Critical Discourse**
2 papers	1 paper
Interpretive Discourse	**Normative Discourse**
19 papers	53 papers

Table 7: Classification of KM Research
(Adapted from Schultze & Leidner, 2002, p.220)

Croasdel et al. (2002) surveyed five years of papers presented at the annual Hawaii International Conference on System Sciences and found that the distribution of research methods were as shown in Table 8.

Research Method	Number of Papers
Conceptual	45
Case based	28
Quantitative	14
Action Research	10
Experiment	2

Table 8: Distribution of Research Methods
(Croasdell et al., 2002)

Unlike Table 7, this table shows a focus in KM research on qualitative, theory-building approaches – conceptual, case based and action research. The difference in findings could be due to both different sources of data and also the different time periods covered by the research with Schultze and Leidner's data covering an earlier period when, as discussed earlier, interpretivism was less prevalent.

3.3 CHOICE OF METHODOLOGY

It is clear from the forgoing that non-positivistic and pluralistic approaches are largely accepted within the IS and KM research communities and the social sciences in general. Some researchers have expressed not only their fondness for qualitative approaches but also their antipathy to quantitative research even more strongly:

> *"Strict adherence to quantitative methods and highly simplified experimentation and the complete neglect of qualitative issues, context and situational complexity, smacks of 'mathematical masturbation' without substantial knowledge of organizations, institutions, or their management" (Ackoff quoted in Gable, 1994, p.114).*

The next question to ask is what paradigm is relevant to, and viable for, the research covered by this thesis involving the discussion and evaluation of many intangibles from the point of view of varying stakeholders. A positivistic, 'one world' view is thus unlikely to be helpful. Schultze and Leidner, discussing normative discourse, say

> *"While there is a great divergence of knowledge management related topics covered in the normative discourse, one unifying theme is that much of the research frames the research question in the context of problem solving and decision-making tasks" (Schultze & Leidner, 2002, p.221).*

This is not the focus of this research. They then describe the research focus of their interpretive discourse classification thus:

> *"generally speaking, the interpretive discourse does not study knowledge directly but rather examines the role of knowledge in organizational transformation … and the role of technologies in supporting knowledge work. Nevertheless, some of the research in this discourse asks questions*

> *specifically directed at knowledge processes, e.g., how individuals most effectively retrieve knowledge. … Moreover, the interpretive discourse explores the work practices that constitute knowledge work. Even in research on IT implementations, the focus is on organizational practices that both enable and inhibit the implementation of technology, rather than on the technology itself". (Schultze & Leidner, 2002, p.223)*

This approach will thus fit well with the direction of this research.

As this thesis neared completion, one of the first comprehensive methodological studies of knowledge management appeared (Guo & Sheffield, 2008). This research also looked at management and IS domains and surveyed five first-tier management journals and five IS journals as shown in Table 9. (They found none of the recently established KM research journals included in any rankings of top journals.)

IS Journals	**Management Journals**
MIS Quarterly	Management Science
Information Systems Research	Decision Sciences
Journal of Management Information Systems	Organization Science
Decision Support Systems	Academy of Management Journal
European Journal of Information Systems	Administrative Science Quarterly

Table 9: Journals Examined
(Guo & Sheffield, 2008, p.680)

They found a majority of articles (77%) using a positivist research paradigm with a still significant minority (22%) interpretivist. (The remaining 1% - one paper - was categorised as critical pluralist.)

3.4 RELEVANCE

Pettigrew (1997) suggests management research faces a double hurdle. First it should be scientifically rigorous and theoretically interesting and second, it should have relevance to the business community.

> *"Although management is an applied discipline… only a limited amount of management research reached the practitioner audience" (Kelemen & Bansal, 2002, p97)*

Kelemen et al. suggest that there are two reasons for this problem of the lack of relevance of academic research to practitioners: the interests of the practitioners and researchers is not the same, or the research is disseminated in such a way that it is not attractive to practitioners.

Considering the first of these reasons, Gibbons et al. (1994) introduced the concepts that they call 'Mode 1' and 'Mode 2' production of knowledge. They summarise Mode 1 as the pursuit of 'scientific truth' by 'scientists'. Mode 1 is university centred, mainly cognitive, dependent on peer review for validation and 'applied later, by others, if it is applied at all.' Mode 2 is the production of knowledge from application. Practitioners tend to be transdisciplinary, group based and validation happens from usage. Huff (2000) looked at Gibbons work as applied to business schools and concluded that most would remain focussed on Mode 1 (with the occasional nod towards Mode 2) primarily for reasons of inertia and the strength of the Mode 1 infrastructure. This academic pursuit of knowledge, often unconnected to the needs and problems of practitioners is seen by practitioners as esoteric and irrelevant (Astley & Zammuto, 1992).

Kelemen et al. (2002) conclude that the second reason for a lack of relevance – that involving dissemination – is largely down to the style of writing. Management researchers tend to write in a highly formalised style following institutionalised conventions (Denzin & Lincoln, 2000) whereas managers appreciate research in a clearer style that resonates with their needs (Weick, 1995).

These tensions between researcher and practitioner were echoed by Starkey and Madan (2001) who recommended new approaches to research partnerships and training. However they stressed that changes in the way practitioners become involved in research were just as necessary as changes in academic mind-set.

Both the academic and practitioner communities continue to address these problems and work towards greater relevance.

"Overall, the long-term aim of the management research community must be to develop a high quality and highly relevant management research on which both the academic and practitioner communities can reliably base their thinking, decision-making and actions." (Tranfield, 2002)

This research will endeavour to have some relevance in both the respects mentioned. Its aim is to investigate an area which is of interest to practitioners and organizations – enablers and constraints of knowledge sharing - and apart from the academic output, the results will be fed back to those involved in a format useful to them.

3.5 QUALITATIVE RESEARCH METHODS

A number of research methods are applicable to qualitative research methodologies and Denzin and Lincoln (2000) list a number of which the following are relevant to the chosen methodology.

3.5.1 ACTION RESEARCH

Action research is an approach that assumes that the world is constantly changing and that both the researcher and the research are part of the change. Reason and Bradbury (2001) define it as 'the whole family of approaches to inquiry which are participative, grounded in experience, and action-oriented.' The main aim of action research is to 'enter into a situation, attempt to bring about change and monitor results' (Hussey & Hussey, 1997, p.65) and close collaboration is required between the researcher and the client company. There is mutual control of research and analysis of results. Kemmis and McTaggart (2000) describe action research as centring on a 'spiral of self-reflective cycles' of

"planning a change,
acting and observing the process and consequences of change,
reflecting on those processes and consequences, and then
replanning,
acting and observing,
reflecting, and so on…"
(Kemmis & McTaggart, 2000, p595)

They also suggest that there are seven other major features of action research: Action research is…

… a social process,

… participatory,

… practical and collaborative,

… emancipatory,

… critical,

… recursive, and

… aims to transform both theory and practice.

Action research is unlikely to be viable for this research as neither the time nor the opportunities will be available to develop the close relationships necessary between the researcher and company.

3.5.2 ETHNOGRAPHY

There are a number of approaches to ethnography, but in general it is a methodology where the researcher uses socially acquired and shared knowledge to understand patterns of behaviour. It involves "*an ongoing attempt to place specific encounters, events, and understandings into a fuller, more meaningful content*" (Tedlock, 2000, p.455). The researcher is often a working member of the group being studied hence the main method of collecting data is participant observation – "*the researcher studies an intact cultural group in a natural setting during a prolonged period of time by collecting, primarily, observational data*" (Creswell, 1994, p.11). Fay emphasises that ethnographers are not merely passive observers, but are affected by the process of 'each looking at each other looking at each other.' (Fay, 1996, p.45). This research is not principally observational and neither is the researcher in long-term contact with the group so this research method is not ideal.

3.5.3 GROUNDED THEORY

Grounded theory was first developed for the medical field by Glaser and Strauss (1967) but has since spread to many disciplines. It uses 'a systematic set of procedures to develop an inductively derived grounded theory about a phenomenon. The findings of the research constitute a theoretical formulation of the reality under investigation, rather than consisting of a set of numbers, or a

group of loosely related themes.' (Strauss & Corbin, 1990). The approach allows the researcher to develop theory by repeatedly using inductive and deductive thought. This cycle is repeated in an effort to *ground* the theory in the data. Some researchers (e.g. Strauss & Corbin, 1998) have taken a very positivist approach to the use of grounded theory while others (e.g. Charmaz, 2000) have championed a constructivist approach. The research covered by this thesis is not trying to develop a theory. It is closer to exploratory research and thus the grounded theory approach is not really appropriate.

3.5.4 CASE STUDY

A case study is an empirical inquiry that seeks to understand a phenomenon within its real-life context. Yin (1994) suggests there are five types of case study (each of which may involve single or multiple cases) and that these can be used to explain the causal links in real-life interventions that are too complex for the survey or experimental strategies; describe an intervention and the real-life context in which it occurred; illustrate certain topics within an evaluation; and explore those situations in which the intervention being evaluated has no clear, single set of outcomes. Finally, the case study may be a meta-evaluation, a study of an evaluation study. Stake (2000) expands Yin's concepts of single- and multiple-case designs and categorizes case studies into intrinsic case studies (where the researcher wants a deep understanding of a particular case), instrumental case studies (where the case is used to provide insights into a particular issue) and collective case studies (where a number of cases are studied to investigate some general phenomenon). As case studies can cover such a wide methodological spectrum, it has been suggested (Braa & Vidgen, 1999) that it is useful to distinguish between positivist *hard* case studies and interpretive *soft* case studies. Hard case studies 'allow reality to be captured in detail and many variables to be analysed; from a positivist stance, problems with case studies include the difficulty of generalization, lack of control over variables, and different interpretations by different stakeholders' (Braa & Vidgen, 1999, p.29). From the positivist perspective, four tests are commonly used to establish the quality of any empirical qualitative research. These are construct validity, internal validity, external validity and reliability. (Yin, 1994). During the data

collection phase, construct validity can be increased by using multiple sources of evidence, establishing a chain of evidence and ensuring that key interviewees review draft reports. Internal validity is not relevant to exploratory studies as they are not concerned with making causal statements. External validity is concerned with knowing whether a case study can be generalised. This is normally tested through replication over multiple case studies. Reliability is concerned with ensuring that another researcher could replicate both the research and its findings. This can be helped by careful documentation of all procedures undertaken during the research. An alternative soft approach to case studies comes from Walsham (1993), who argues that the validity of interpretive case studies comes not from statistical representativeness, but from logical reasoning and drawing conclusions from the results. Walsham also suggests that his prime aim 'is to justify the view that the most appropriate method for conducting empirical research in the interpretive tradition is the in-depth case study'. Even some supporters of the case study approach express some worries that case studies sometimes fail to meet the rigorous requirements of replicability and external validity (e.g. Miles & Huberman, 1994; Yin, 1994) however Numagami argues that 'the search for invariant law should not be the main objective of management studies' (1998, p.2).

In Guo's survey of KM methodologies and methods mentioned earlier (Guo & Sheffield, 2008), their survey of research methods found that the most common was the sample survey (50%), followed by field studies (31%).

Referring back to the beginning of this section, Yin's 'exploratory' case study approach is appropriate for this research as is Stake's idea of collective case studies and these will be discussed further later.

3.5.5 TRIANGULATION

To improve validity and reduce the likelihood of misinterpretation, researchers can employ triangulation. Triangulation has been described as 'a process of using multiple perceptions to clarify meaning, verifying the repeatability of an observation or interpretation' (Stake, 2000, p.443). Triangulation of qualitative and quantitative data can thus increase validity – Kaplan and Duchon suggest

that 'Collecting different kinds of data by different methods from different sources provides a wider range of coverage that may result in a fuller picture of the unit under study ... Moreover, using multiple methods increases the robustness of results because findings can be strengthened through triangulation – the cross-validation achieved when different kinds and sources of data converge and are found congruent' (Kaplan & Duchon, 1988, p.575). There is a plethora of topologies of triangulation: data, investigator, theoretical, methodological, multiple, between-methods and within-methods triangulation (Denzin & Lincoln, 2000; Jick, 1983); simultaneous and sequential triangulation (Morse, 1991); planned and unplanned triangulation (Deacon, Bryman, & Fenton, 1998); validity, complementarity and trigonometrical (Kelle, 2001). Knafl and Breitmayer (1990) have managed to organise these many types into two strands based on what they see as the two principal aims of triangulation in the social sciences: convergence and completeness.

Danziger and Kraemer (1991) comment that fieldwork such as case studies and survey research have always been alternative sources of evidence and ideas and are not competitive approaches. Gable (1994) considers the relative strengths and weaknesses of these two approaches and summarises them in a table (Table 10).

	Case Study	**Survey**
Controllability	Low	Medium
Deductibility	Low	Medium
Repeatability	Low	Medium
Generalisability	Low	High
Discoverability (explorability)	High	Medium
Representability	High	Medium

Table 10: Relative Strengths of Case Study and Survey Methods
(Gable, 1994, p.114)

Gable emphasises that the table is a generalisation and the details will vary with the specifics of research design; however, there are likely benefits in combining these two methods.

3.5.6 CHOICE OF RESEARCH METHODS

The choice of method depends on the type of research question, the level of control the researcher has over actual behavioural events and whether the focus is on contemporary or historical events. The research method also needs to fit in with the researcher's methodological assumptions and the researcher must be comfortable with the method. Yin (1994) offers a table (Table 11) summarising the use of differing strategies which supports the use of case studies for this research.

Strategy	Form of Research Question	Requires control over behavioural events?	Focuses on contemporary events?
Experiment	how, why	yes	yes
Survey	who, what, where, how many, how much	no	yes
Archival analysis	who, what, where, how many, how much	no	yes / no
History	how, why	no	no
Case study	how, why	no	yes

Table 11: Case Study Strategies.
(Yin, 1994, p.6)

The nature of the research question suggests an exploratory approach. This, coupled with organizational access opportunities (which are likely to preclude action research) suggests a case study approach as the preferred option. The possible benefits of triangulation have also been discussed and so the data collected by case study will be complemented by a survey within each organization.

3.6 RESEARCH DESIGN

Sharing knowledge involves more than one person and so the unit of analysis for this research is the organization or – depending on the size of the organization –

groups within the organization (although the source of data will be individuals within the organization).

3.6.1 CASE STUDY DESIGN

The choice of organization is important to the case studies. For this study, it was of primary importance that the organizations were engaged in knowledge management (or at least thought they were) and were prepared to talk about it. The initial starting point was Miles and Huberman's (1994) 'snowball' sampling where discussions with those involved with knowledge management leads to other contacts and suggestions. Denzin and Lincoln (2000, p.447) stress that it is also important to choose cases on the basis both of opportunities to learn and of accessibility; a point emphasised by Marshall and Rossman (1999) who point out that the first priority is the possibility of entry. They also suggest a need for a 'rich mix of […] processes, people, programs, interactions and structures of interest' (1999, p.69) to be present which points to the choice of larger organizations.

The aim of this research is not to look at knowledge sharing in an industry-specific way, but to take a general approach across industries. The initial choice of possible participants was thus based on discussions with non-academic contacts working in the KM arena who suggested a number of other possible participants and personal contacts. These latter are extremely valuable in gaining access to an organization. Discussion with these contacts then led to a short list of organizations who:

a) were actively involved in KM,
b) were willing to take part,
c) were not all in the same industry,
d) were interested in feedback from the research, and
e) were medium to large in size.

The number of organizations to involve (i.e. the number of cases) and the number of interviews in each has to be decided. There is a conventional wisdom that "the more data the better", but the available time for data analysis has to be

taken into account. Allowing for interview time, transcription and analysis, it is suggested that at least a week per interview is allocated. (e.g. Stroh, 2000) so selecting five organizations and aiming to interview four or five people in each will amount to five or six months work.

After obtaining agreement from five organizations to take part, the next stage was to arrange individual interviewees at each.

The number of supportive contacts available to the researcher within each company varied but in each case, a single primary contact was chosen. And all further arrangements made through them. The most senior contact was chosen in each case to facilitate access. Each primary contact was asked to enable interviews with a cross-section of both those directly involved with knowledge sharing along with those who were knowledge workers or 'users' of knowledge. Unfortunately, not every organization provided as broad a cross-section as requested. This is perhaps not unreasonable from the point of view of the companies concerned as providing interviewees for a visiting researcher is unlikely to be their top priority. As such, it is easier for them to provide someone who happens to be available even if they are not the ideal choice from the interviewers point of view.

As a result, while some organizations did provide a cross-section, others varied from providing only KM-involved personnel to providing no one involved with KM at all. The final list of interviewees is given in Table 16 on page 100.

The level of understanding of knowledge sharing is likely to differ between those directly involved with it and 'users' of knowledge. Thus the lack of a cross-section of interviewees could lead to bias in the responses at an individual company level. However, over all the companies involved, the proportion KS to non-KS personnel is more even.

Face-to-face interviews were arranged wherever possible but some proved logistically impracticable. Where necessary, telephone interviews were undertaken, but these were audio recorded in the same fashion as direct interviews. Four interviews eventually took place by telephone, and nineteen were face-to-face.

The involvement of all the organizations was on the basis of anonymity of both the companies and the interviewees and the companies are thus referred to as TelCo, LawCo, PubCo, ProfCo and EngCo. (They are described in detail in Chapter 4.)

Yin (1994, p.80) cites six sources of evidence for use in case studies: documentation, archival records, interviews, direct observation, participant observation and physical artefacts. In this case, the principal source will be interviews, although some relevant documentary evidence may become available – internal reports or surveys for example.

3.6.2 INTERVIEW DESIGN

Interviews usually offer the best access for researchers to participants' views and interpretations of actions and events (Walsham, 1995b) and may range across the spectrum from structured to unstructured. In the former, a series of preset questions with a limited set of acceptable answers is used. Unstructured interviews tend to be more open ended and although it may be harder to compare cases and generalisability may be weaker, flexibility is greater. Although McCrossan (1991) comments that it is important for the interviewer not so say anything that might influence the interviewee, it is important to remember that interviews are not neutral data gathering tools and that however hard an interviewer tries, he or she will still bring their own views and preconceptions to the table.

Face-to-face interviews are a particularly good way of obtaining subject co-operation. They are also a multi-method of data collection (Burton, 2000) as the observant interviewer can build up a contextual analysis and respond to visual cues of the interviewee. Burton also suggests that it is far easier to grow rapport with subjects on a face-to-face basis. This rapport and relationship is also strengthened by the interviewer presenting himself or herself in a fashion acceptable to the interviewee.

Care must also be taken to determine whether interviewees are giving their own opinion or expressing company policy. As Weick (1995) points out, there are

two entities within individual behaviour in organizations: the individual as himself and the individual as a representative of the organization. The individual thus acts not only as himself but also in a more subtle way 'as the organization', embodying its values and beliefs.

Easterby-Smith et al. (1991) suggest that semi-structured interviews are appropriate where the interviewee's context is unclear, the step-by-step logic of situations is not clear, or the subject is confidential or sensitive. These are likely to apply to this research. Interviewees may, for example, have varying views on what constitutes success for any particular knowledge management project and the step by step logic of their approach to knowledge management may well be unclear prior to the interviews. Coolican (1999) suggests that the semi-structured interview will act as a topic guide for the interviewer while allowing flexibility during the course of the interview. The fact that this is exploratory research means that this flexibility is valuable in allowing the researcher to pursue interesting and relevant lines of enquiry. These arguments suggest semi-structured interviews as the best approach for this research.

The ethics of interviewing are also important – the interviewee must give informed consent to the interview and their right to privacy must be respected. All identities are thus anonymised in this thesis.

3.6.3 INTERVIEW PROTOCOL

As semi-structured interviews will be used, it is necessary to develop an interview protocol and thus have a set of guiding questions to ask.

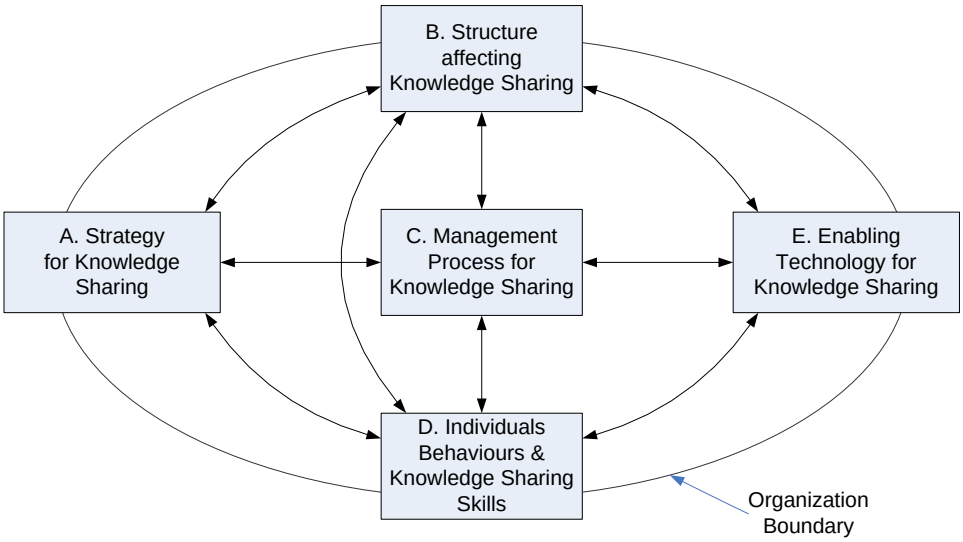

Figure 22: Research Framework

These guiding questions will be developed to help answer the research question and, as discussed earlier, these will be based around the MIT90s framework adapted to knowledge sharing (Figure 22). The questions will look at the existence and effectiveness of any corporate strategy for knowledge sharing, the technology available to enable or assist knowledge sharing, and the cultural constraints and enablers for knowledge sharing which will include organizational structures, management processes and the capabilities and roles of individuals. The questions will be asked of a range of interviewees within each organization. Specifically, the interviews will endeavour to include those *responsible* for knowledge sharing at the executive level, those *driving* knowledge sharing within the organization, and those *doing* knowledge sharing.

These questions are detailed in Table 12. The letters refer to the boxes and linkages in Figure 22. The initial questions cover a variety of issues involving knowledge and business strategy and are used to 'set the scene' by trying to elucidate the interviewees' understanding of terminology, identify the role of knowledge in the organization and whether or not any efforts are made to evaluate any benefits. Subsequent questions have been derived by considering

the boxes and linkages of the framework and how they are supported in the literature.

Although specific questions are given here, these questions will act primarily as a topic guide for the interviewer while allowing flexibility in the course of the interviews.

Initial Questions	Do they perceive a difference between data, information and knowledge? (Alavi & Leidner, 2001; Davenport & Prusak, 1998) Do they perceive a difference between tacit and explicit knowledge? (Nonaka, 1994) What is the role of knowledge in the organization? (Grant, 1996) What does the organization perceive as the business benefits of knowledge sharing? (de Gooijer, 2000) Are there any indicators for knowledge sharing measurement (Holsapple & Joshi, 2002) and what evaluation processes or approaches, if any, are used? (Bontis et al., 1999; Sveiby, 2002)
A	Is there a knowledge strategy or a strategy for sharing knowledge? (Allweyer, 1999)
B	How does organizational structure help or hinder knowledge sharing in practice? (Gold et al., 2001; O'Dell & Jackson Grayson, 1998)
C	Are there any processes in place to support knowledge management or sharing? (Allweyer, 1999; Coakes et al., 2004; Davenport et al., 1996)
D	How do people understand knowledge and what skills and behaviours do they need for knowledge sharing? (Kalling & Styhre, 2003)
E	What technologies are used to enable knowledge sharing? (Damsgaard & Scheepers, 2001)
A ⇔ B	Does organizational structure support the knowledge strategy? (O'Dell & Jackson Grayson, 1998)
A ⇔ C	Are knowledge-intensive business processes identified? (Allweyer, 1999)
A ⇔ D	Does the organizational knowledge strategy motivate people to share knowledge? (Disterer, 2001)
B ⇔ C	Do organizational structures and knowledge sharing processes mutually support one another to enhance knowledge sharing? (Disterer, 2001; Teece, 2000)
B ⇔ D	Does organizational structure help individuals to share knowledge? (Davenport et al., 1996)
B ⇔ E	Is technology used to help knowledge sharing and where in the organization is this technology developed? (Damsgaard & Scheepers, 2001)
C ⇔ D	Do the organizational knowledge processes help both knowledge dissemination and knowledge collecting? (van der Hooff & de Ridder, 2004)
C ⇔ E	What technologies specifically help or hinder knowledge sharing? How? (Damsgaard & Scheepers, 2001)
D ⇔ E	How is technology used to support knowledge sharing processes? (Hansen et al., 1999)

Table 12: Subsidiary Questions

3.6.4 SURVEY

The benefits of triangulation by combining the case studies with a survey have been discussed. In addition to the research framework, other knowledge management survey questionnaires were examined to ascertain if there were other relevant approaches to the survey that should be considered. The Knowledge Management Assessment Tool (KMAT) (de Jager, 1999) considers four enablers of knowledge management – leadership, culture, technology and measurement – which are held together by a system of processes. See Figure 23.

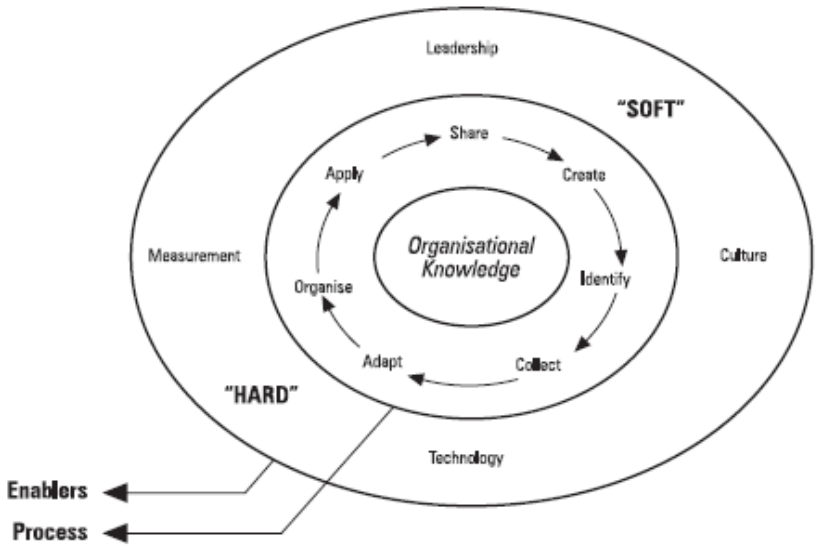

Figure 23: The KMAT Model
(de Jager, 1999, p.370)

KMAT considers *leadership* to include both strategic issues as well as management support to KM. *Culture* is concerned with areas such as facilitation, learning, motivation, rewards and recognition. *Technology* looks at the technological facilities for communications and sharing. *Measurement* concerns the efforts the organization makes to try and understand the benefits accruing from KM in both qualitative and quantitative ways. Finally, *process* considers the processes in place to make the preceding four enablers effective. There is thus some significant level of commonality with the research model although KMAT does not explicitly consider organizational structure while adding measurement.

The survey questions were developed using the research framework. They were not mapped directly to the interview sub-questions as the latter are designed to be 'guide' questions to help tease out information through discussion whereas the survey questions need to be closed questions that can be answered simply within a predetermined range of responses. See Table 13.

1. We are a knowledge-intensive company.	General question to ensure the respondent sees knowledge as important.
2. Knowledge sharing is commonplace in my company.	General question to see whether knowledge sharing is perceived as taking place in the organization.
3. We are efficient in the way we share knowledge within my company.	This question looks qualitatively at measurement.
4. In general, knowledge sharing and learning are valued by my company culture.	This question looks to see if strategy or leadership lead to a valuing of KS.
5. Individuals are recognised and regarded for sharing knowledge.	This is a 'people' question to see if KS is recognised and/or rewarded.
6. The senior management of my company are serious about encouraging knowledge sharing.	This question looks at senior management support for KS.
7. My company has the technology it needs to support knowledge sharing.	This question considers the technological support for KS.
8. My company has business processes in place to support knowledge sharing.	This question considers whether there are any processes that support KS.
9. The sharing of knowledge within my company is continually improving.	This considers whether the culture of the company encourages improvement in KS.
10. My company evaluates the benefits of sharing knowledge.	This question is about measurement.
11. Our company is better at sharing knowledge than our competitors.	This more general question asks how respondents perceive their organization in the marketplace.
12. Knowledge sharing improves the overall performance of my company.	This question is about the perceptions of the importance of knowledge sharing.

Table 13: Initial Survey Questions

Each question takes the form of a statement with responses based on a 5 point Likert scale running from 'Strongly Agree' to 'Strongly Disagree'.

This questionnaire was then sent to 3 people unconnected with this research or the companies involved. They were given a very brief background to the research in progress and asked whether the questions were, in their view, answerable and relevant. The feedback was as follows:

Q2 - Knowledge sharing is commonplace in my company. The respondents felt that answers to this question would be very variable depending on their position in the company. It was thus decided to add a question to ascertain the position in the company of the respondent.

Q3 - We are efficient in the way we share knowledge within my company. The word *efficient* caused disquiet in this question as it requires a measure or a point of reference. A proposed alternative of 'We are good at knowledge sharing and it fully meets the needs of the business' was accepted.

Q7 - My company has the technology it needs to support knowledge sharing. It was proposed and accepted that this question should be more personally directed as the need for technology could depend on the respondent's position. 'I have access to the technology I need for knowledge sharing.' was agreed as an alternative

Q11 - Our company is better at sharing knowledge than our competitors. It was suggested that this question was unanswerable. However as we are asking for the perceptions of the respondents, it was decided to leave it in.

With these suggestions taken into account and the questions rearranged into a more logical order for the respondent, the final list of questions thus became:

1. We are a knowledge-intensive company.
2. Knowledge sharing is commonplace in my company.
3. We are good at knowledge sharing and it fully meets the needs of the business.
4. Knowledge sharing improves the overall performance of my company.
5. In general, knowledge sharing and learning are valued by my company culture.
6. Individuals are recognised and regarded for sharing knowledge.
7. The senior management of my company are serious about encouraging knowledge sharing.
8. I have access to the technology I need for knowledge sharing.
9. My company evaluates the benefits of sharing knowledge.
10. My company has business processes in place to support knowledge sharing.
11. The sharing of knowledge within my company is continually improving.
12. Our company is better at sharing knowledge than our competitors.

Table 14: Final Survey Questions

In addition, each respondent's company and their position in the company were collected.

The questionnaires were made available both on paper (with a faxed response) and as a secure website. This survey form is shown in Appendix 1.

3.6.5 RESEARCH PLAN

The major activities of the research plan are data gathering, data analysis and report preparation (Marshall & Rossman, 1999). A case study protocol was developed which included a brief overview of the case study project, a set of procedures for undertaking the case study (including the interview protocol), and the case study questions. The procedures include a list of the organizations approached, a list of those accepting and a list of the names and roles of those interviewed. Yin (1994) stressed the importance of the creation and maintenance of a case study database to provide a formal, presentable repository for all the data collected. This database includes case study notes, case study documents and narratives and utilises the NVivo software package. The case study interviews were audio recorded and transcribed using voice-input software (IBM ViaVoice). Audio recording is generally considered very important and worthwhile (Belanger, 1999). Belanger also noted that recording should be a complement to, not a replacement for, note taking and that permission for recording must be obtained in advance. The resulting computer files form the case study notes. Case study documents include any documentation collected from organizations during the case study process. This case study database can, in principle, be reviewed by other researchers thus increasing the reliability of the study (e.g. Darke, Shanks, & Broadbent, 1998).

The data analysis must show that all relevant evidence has been included and that the most significant aspects of the case study have been addressed. Miles and Huberman (1994, p.10) define analysis as three concurrent flows of activity. *Data reduction* refers to the process of selecting, focusing, simplifying, abstracting and transforming the data that appears in case notes. *Data display* is some way of compressing and assembling information from the data that allows us to draw

some conclusions. The third flow is *conclusion drawing and verification*. These three flows are followed in the remainder of this thesis.

This chapter began by reviewing the historical background to the philosophy of science and how this has led to different perspectives for research. Positivist and interpretivist approaches were then described and contrasted and their development discussed. Next, research methodologies in knowledge management were explored and an interpretivist approach was justified. The importance of relevance of research was then discussed.

Qualitative research methods were then considered and the choice of methods – case studies triangulated with survey data – were developed and justified. Finally, the research framework was used to develop the details of the research design including the case study design, interview design and protocols, the survey and the research plan.

The next chapter will examine the resulting interview data.

4 INTERVIEW DATA

The first phases of analysis involve organising the data, generating categories or themes and coding the data (Marshall & Rossman, 1999). The aim being to take the large volume of data collected and to break it down into manageable pieces such that we can begin to make some sense of it.

To organise and keep track of the data, NVivo has been used as a case study database (Yin, 1994). Although initially developed to aid in qualitative data analysis, NVivo 7 – the version used – also has many other abilities and facilities which lend themselves to tracking and storing in a structured fashion nearly all aspects of the research data. NVivo is being used to store not only all the original interview transcriptions but also notes about interviews, documents from interviewees, interim notes of analysis ideas and links to the original interview audio files.

The remainder of this chapter covers within-case analysis. The companies and interviewees are described in detail at the start of each company section. This is followed by an analysis of the data looking at each section of the model in turn: Strategy – Structure – People – Process – Technology and this data is all then presented in a tabular summary. After this, there is a section considering any other areas of interest found in the analysis that do not readily fall into one of the

categories of the model and the next section considers any linkages between the 'boxes' of the model. Finally, the organizations' knowledge perspective is considered based on the approach of Hansen (1999) and Maier (2002) as discussed in the literature review and summarised in Table 5.

The purpose of this analysis is to see how all the themes of the model interplay within a single company.

Before proceeding to an analysis of the data within companies, the coding procedure is discussed and the companies and the interviewees will be described.

4.1 THEMES AND CODING

The purpose of the interviews is to collect data about knowledge sharing in the organization and to see how it relates to the research model.

Themes are 'abstract (and often fuzzy) constructs' (Denzin & Lincoln, 2000, p.780) which the researcher may find before, during or after data collection. Some themes will arise from the literature review and the research model and others will arise from the text of the interviews as the researcher continues to read and re-read (Miles & Huberman, 1994).

Coding the information gathered into themes is an aid to sensemaking and interpretation.

> *'The goal [of qualitative coding] is to learn from the data, to keep revisiting it until you understand the patterns and explanations … Coding is not merely to label all the parts of documents about a topic, but rather to bring them together so they can be reviewed, and your thinking about the topic developed.' (Richards, 2005, p.86)*

Miles and Huberman (1994, p.56) go so far as to say 'coding is analysis'.

Coding is an iterative process and involves both topic and analytic coding (Richards, 2005) although the two are not always distinct. Topic coding involves simply allocating passages to themes while reading the transcripts. In analytic coding, a series of mental questions are asked about each passage. The first

reaction is often '*That's interesting'* which should be followed by the question '*Why is it interesting?*' and then by '*Why am I interested in that?*'. It is this last question that points towards an analytic category (Richards, 2005, p.94).

The interview transcripts were read and re-read and relevant passages were coded at nodes – as NVivo calls the process of attaching a passage to a theme. To check the consistency of coding, documents were re-coded over time and the results compared. 100% consistency is not expected as the coder's thoughts and ideas will change over time but differences can be compared and examined to ensure the reasons for them are logical and explicable.

During this process many themes and sub themes suggest themselves and no particular effort is made to relate them to one another. Passages coded at each node are frequently reviewed as the process continues. As new themes are developed, some passages seem more relevant to a new theme. Sometimes themes are combined when they are found to be really about the same thing.

The use of the research model inevitably guides the researcher's thinking so many themes will be related to the model. However, other themes that arise can be equally important and in either case patterns that arise may support or negate growing understanding or theories. For every plausible explanation that arises, alternative explanations should always be considered.

The final list of nodes which arose is shown in Table 15 and further node details can be found in Appendix 4.

Knowledge and KM
- Collecting v Donating knowledge
- Data - Information - Knowledge
- KM - what it is
- Knowledge quality
- Tacit v Explicit

KS Measurement
- Evaluation processes
- Indicators
- Measurement Problems

Linkages

People-Culture
- Buzz word problem
- Culture - effects of
- Different Knowledge for Different People
- Know who is important
- Knowledge is Power
- Motivation
- Rewards for sharing
- Skills and behaviours
- Time Constraints and Priorities
- Time sheets

Process
- Knowledge processes
- Knowledge Transfer
- KRT

Sharing techniques
- CoP
- Discussion forums
- Instant Messaging
- Intranet
- Learning from Practice
- SNA
- Storytelling
- Tagging

Strategy
- Business Benefits of K
- Executive ownership of KM
- Knowledge Strategy
- Role of Knowledge in Org

Structure
- Connecting People
- Organizational Structure
- Responsibility for KS
- Size problems

Technology
- Technology - collaboration
- Technology - Negative
- Technology - Searching
- Technology - use of

Table 15: Node List

The analysis process is shown in Figure 24

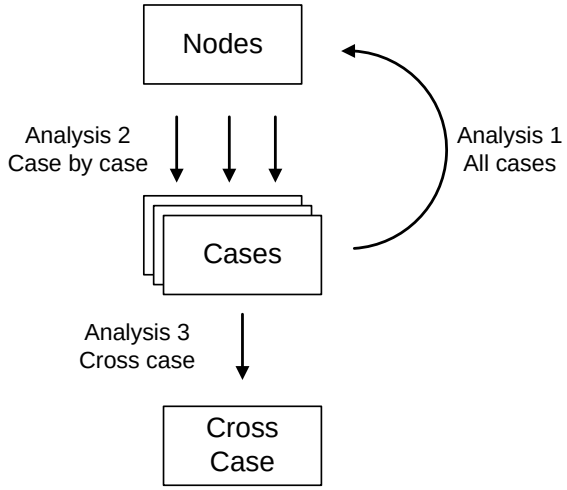

Figure 24: Analysis Process

The process of developing nodes by reading and re-reading the data is shown as Analysis 1. The second stage, Analysis 2, is a case by case approach and finally Analysis 3 will consider the cross case data.

4.2 COMPANY AND INTERVIEWEE CODING

The table on the next page lists all the company codes, interviewee codes and gives a brief description of the person's role. The codes below are used to identify all quotes taken from the interview transcriptions. Telephone interviews are marked thus *

Company	Interviewee	Brief Description
TelCo	Int1	Corporate KM consultant
TelCo	Int2	Senior business consultant
TelCo	Int3 *	Member of the corporate document and KM steering group.
TelCo	Int4 *	Operations manager
LawCo	Int5	Senior partner
LawCo	Int6	KM Coordinator
LawCo	Int7	Newly-qualified lawyer
LawCo	Int8	Training manager
LawCo	Int9	Administration manager
LawCo	Int22	Experienced lawyer
PubCo	Int10	Divisional director
PubCo	Int11	Divisional director
PubCo	Int12	CEO
PubCo	Int13	Divisional director
ProfCo	Int14	Senior manager
ProfCo	Int15 *	Director
ProfCo	Int16	Manager
ProfCo	Int17	Director
ProfCo	Int18	Manager
EngCo	Int19	Corporate KM group leader
EngCo	Int20 *	KM 'Champion'
EngCo	Int21	KM 'Champion'
EngCo	Int23	KM 'Champion'

Table 16: Interviewees

4.3 TELCO – AN INTERNATIONAL TELECOMMUNICATIONS COMPANY

TelCo is a very large, international telecommunications plc active in all areas of the industry. It employs over 100,00 people worldwide and has revenues of around £20 billion. At the time of the interviews, it operated six group businesses: a retail business aimed at business and residential customers; a wholesale business which ran its own networks and provided network services to other communications companies; a services company providing global services to multi-site organizations worldwide; an internal IT design and delivery company; an operations business providing communications services; and an infrastructure company. The size of the company is such that there is little interaction between these businesses at the employee level.

A search of the company's corporate web site for the terms 'knowledge management' or 'intellectual capital' brought forth a small number of mentions of the terms but all were simply expressing the view that it was a 'good thing'. There was no mention of anything connected with knowledge, knowledge management or intellectual capital in those areas concerned with the company's vision, strategy or values. Searches of the sites of the individual group businesses showed a similar paucity of results except within the global services area which used the term 'knowledge management' extensively in selling its consultancy services. Thus the company does not appear publicly to acknowledge any worth or value in knowledge or knowledge management.

TelCo provided 43 responses to the survey.

4.3.1 TELCO INTERVIEWEES

Four members of staff were interviewed between June and October 2005.

The first (Int1) was a corporate KM consultant working in the internal IT business.

The second (Int2) was a senior business consultant in the retail business who was only involved with knowledge and information sharing peripherally in that it impacted on his responsibilities for improving the performance of help desks.

The third (Int3) was a member of the corporate document and KM steering group. This was a telephone interview. She had been with the organization for many years in a variety of roles.

The last (Int4) was an operations manager based in France who had previously worked in a KM role. This interviewee had also spent many years with the company in many roles. This was a telephone interview and a poor line coupled with her very strong French accent made this a hard interview to transcribe.

4.3.2 TELCO CASE DATA

Strategy

At the top level, there is no strategy for knowledge sharing "*I know from your questions, that you are looking for a strategy for knowledge and all that kind of stuff. I have to be honest and say there isn't one*." (TelCo-Int1). Neither does there seem to be any drive towards having one – "*Not only is there not an overarching strategy, although I've sort of seen […] what you'd call a vision, which is that […] in order to facilitate better collaboration, better decision-making, all those sorts of things - cost effectiveness etc - that we definitely should be going down that route. And we are but at the moment it's sort of all over the place. There's not really any major concerted effort."* (TelCo-Int3) A possibly relevant factor in this lack of a knowledge strategy is that there is no one with specific board level responsibility for knowledge management "*There is no chief knowledge officer. No. It has been recognised, or it has been mooted before, do we need one or not?*" (TelCo-Int1) and there is also a view that senior executives do not really understand what it is all about. "*There are pious statements that come down from on high. They seem to have tailed off over the last year or so, but there used to be quite a lot from the top saying we are a knowledge company and all this kind of stuff. How far that got translated into real action, is a moot point. Not very much. I think it's like where it hits the middle. The people at the top say yes, we are a knowledge company but they don't really understand what that means in terms of providing it. The people in the middle suddenly sort of - the ones with the budget, sort of thing, - you know, it's more important to do this than this airy-fairy stuff which may pay off in a few years, but I've got more pressing needs. And there are other people who - they think they are doing knowledge management, as you say, but all they are doing is*

information management." (TelCo-Int1) This statement implies that while senior management may talk about the importance of knowledge management, they have not put anything in place to encourage the lower levels of management to take it seriously. At this level there is also less clarity between information and knowledge management.

Within the specific business area that one of our interviewees was connected with, relevant knowledge sharing or knowledge management was covered in their local business or project strategies. "*Within the [division] strategy is a blending of that, bringing together and within that strategy is the concept of sharing knowledge for both our external customers and internally as well. So knowledge sharing and knowledge strategies are a fundamental part of the [division] strategy*." (TelCo-Int2)

In summary, no one at senior corporate level had a specific responsibility for knowledge sharing or knowledge management and thus the organization had no overall strategy for knowledge sharing. In addition, there was a view that while senior management publicly extolled the virtues of knowledge sharing, they did nothing, in practice, to support it which resulted in knowledge sharing having a low priority with middle management.

Structure

Knowledge sharing does not seem to be deliberately considered in terms of organizational structure and the interviewees were unanimous in feeling that the structure was, at best, neutral in its effect on knowledge sharing: "Interviewer: *Do think the structure of the organization helps knowledge sharing?* Interviewee*: I don't think it helps. I think it happens, but I don't think there's anything in the actual structure that makes it happen. It happens despite the structure.*" (TelCo-Int1)

"*I know that when we looked at our integrated model, the structure is counter to our knowledge sharing strategy*." (TelCo-Int2)

"*I suppose I'd have to say that in the main it probably hinders more than it helps*" (TelCo-Int3)

"*If I am very blunt, I think it doesn't help it really. It may have stopped hindering it as it did four or five years ago*" (TelCo-Int4)

All of these statements agree that the structure does not help knowledge sharing, but, on the other hand, one interviewee did suggest that structure has little effect on knowledge sharing at an individual level "*I don't really think that's got anything to do with the structure really. If you want to share knowledge, you share it really, won't you?*" (TelCo-Int3) suggesting that a strong enough positive motivation to share will outweigh any problems caused by organizational structure.

People

The culture of some parts of the organization emphasises delivery which encourages people to learn who to go to for information and knowledge. "*It's who you know and what they know - and you sort of like make the contacts through and you circumvent things and processes to get something done. So it's very much a culture of, you're measured against deliveries and all this sort of stuff, so people will find a way of making sure that delivery happens despite*." (TelCo-Int1)

However in some areas, the feeling that 'knowledge is power' is still widespread "*Why should I impart this knowledge which gives me the ability to do my job better than Fred down there. If I give that information to Fred, he might be able to do my job better than I do*" (TelCo-Int3) and there is a view that your personal knowledge is what gives you your 'edge'. "*I know how to do this - you don't. Therefore I've got a job next week and you haven't*!" (TelCo-Int1) Both of these statements imply that people are protective of their personal knowledge and that they perceive their value to the organization to be related to what they know rather than whether they share it. One interviewee however felt that although this view had been prevalent, things were slowly changing. "*I have been 13 years in […], I think we have really evolved from a culture which was there originally which was information was power and people keep things to themselves - I think now there is much more willingness to share information*" (TelCo-Int4). In a similar vein, the interviewees all agree that people do not understand what skills and behaviours are needed to be able to share knowledge; "Interviewer: *Do you think people understand what skills and behaviours*

are needed to be able to share knowledge - to help share knowledge? Interviewee: *No*." (TelCo-Int3) and "*I'm not sure we do really well*" (TelCo-Int2).

There has been discussion within the organization on incentives for sharing, but no real conclusions have been reached partly due to uncertainty as to what incentives to use. "*So what do you incentivise them on, volume? Or quantity, or quality*." (TelCo-Int3) There is also beginning to be some interest in team performance coming into individuals' performance appraisals – "*One of the things that you are measured against is your collaboration with other people and your sharing. But that's the only time it ever turns up as being a sort of, something - I think it's just lip-service*." Once again, we see a slightly cynical view as to whether this is really taken seriously. (TelCo-Int1) In addition, thought has been given to rewarding successful teams but it is not well publicised. "*I think that now there is something starting about helping others in the team or putting information forward or things like that. But I haven't seen much encouragement on the webs and things and newsletters etc. I don't have the impression that people are specifically motivated*." (TelCo-Int4)

In the division involved with help desks, sharing is improved by encouraging feedback. "*They get a thank-you, and that also goes to their manager as well … so [for example] for the millionth bit of feedback, we give somebody a brand new DVD*" (TelCo-Int2) and an education process has encouraged sharing. The same interviewee felt that there was an altruistic desire to share amongst these help desk operatives - "*But the initial seeding of that information has come from a desire from the people themselves to share that information across a much broader audience of people in the knowledge that if they can service their customers better by using that information the likelihood is that other people can benefit as well."* (TelCo-Int2) However he offered no evidence for this and these help desk workers are in reality dependent on fast and efficient access to information rather than being true knowledge workers. Additionally, these workers are measured on their speed and accuracy of answering queries and thus it is debatable whether their desire to share is truly altruistic or merely a recognition of the fact that the more they share the better they are likely to perform against their measured targets.

Overall, although there are many tools to help employees find the information or contact they need, people value the knowledge they have and there is little to

motivate them to share it other than the beginnings of some consideration of 'collaboration' in annual staff evaluations.

Process

Some areas have workflow processes which involve collecting feedback. "*They are primarily based around workflow so that on our data pages we have feedback processes*" (TelCo-Int2), otherwise, despite the fact that there are business processes for almost everything else, there are none specific to knowledge sharing "*Because we don't have that overarching strategy in place and we don't have policies or anything else*" (TelCo-Int3) although some may help knowledge sharing as a by-product "*I think there is starting now to be business processes … that definitely helps the sharing and that's the case in a number of areas of the business that I can see*" (TelCo-Int4).

Overall, although there are no top level processes focussed on knowledge sharing, some lower level processes tend to assist or encourage it in some way although not in any planned way.

Technology

Within this organization, which is hugely technology-capable, almost everything is delivered via a corporate intranet. However, there seems to be some confusion as to whether the intranet is really a collaboration tool or simply an information repository – "*I mean, our intranet is basically a collaborative tool - No it's not a collaborative tool - oh, I suppose it is - sort of loosely - it's not very interactive but people put information on and other people take that information off.*" (TelCo-Int3). This comment probably indicates organizational as well as personal confusion in that the intranet has been created primarily as a means of storing data and information rather than as a collaboration tool. In addition, there were doubts about the search capabilities of the current technology. "*searching across the structured and unstructured stuff is something that is becoming more of an issue for us*" (TelCo-Int1)

In some areas, it is recognised that it is vital that the technology does what the users want or they won't use it. "*And this is something that I think we've learned a real lesson on, is that if you don't listen to the people, they won't use it. If you listen to them and you demonstrate that you have listened and that you are prepared to reach even a degree of compromise in putting those suggestions in - you get a much better response in terms of usage than you would do if you said 'this is it, fellows - get on with it and use it. This is how to use it' – 'Well I don't want to use it because it doesn't do what I want it to do - or if I do want to use it, it's the third or 4th page along'. That's not any good.*" (TelCo-Int2) This emphasises the importance of ensuring that the technology meets the needs of the users by involving them in the design and delivery at an early stage.

Although most of the technology was intranet based, instant messaging is also becoming popular "*I think it brings people closer together because you can have a very quick exchange of views and thoughts. Saving time*." (TelCo-Int4). Finally, there was a significant lack of standardisation on technology because all budgets holders appear to be able to follow their own technological ideas – "*If somebody can do something and their boss says 'I've got an extra 50 grand in my budget. Yes, go off and buy that and we can make this' – then they'd probably go off and do it."* (TelCo-Int3).

All in all, technology – despite enormous resources – lacks focus on user needs and tends to be too localised. In addition it focuses mostly on areas to do with information storage rather than tools to promote sharing.

These findings are summarised in Table 17.

Strategy • No overall strategy for KM or KS. • No one at board level has specific responsibility for either. • As a result, middle management do not take KS seriously.
Structure • Knowledge sharing does not seem to be deliberately considered in terms of organizational structure. • The interviewees were unanimous in feeling that the structure did not help knowledge sharing. • On the other hand, there is a feeling that structure has little effect on knowledge sharing at an individual level.
People • The view that 'knowledge is power' is prevalent and militates against KS. • Skills and behaviours needed for KS are not really considered. • There is currently little incentive to share knowledge although various ideas including team rewards have been discussed.
Process • Some areas have workflow processes which involve collecting feedback. • Despite the fact that there are business processes for almost everything, there are no processes specific to knowledge sharing. • Some may help KS as a by-product.
Technology • This organization is hugely technology-capable and almost everything is delivered via a corporate intranet but the focus is on information, not knowledge. • Whether or not this all helps collaboration seems debatable. • There were doubts about the search capabilities of the current technology. • User involvement in design so that systems deliver user needs was considered vital for system acceptance.

Table 17: TelCo Summary

Other Areas

Attributes of Knowledge

There is a widespread understanding of data - information - knowledge among those involved with KM. One interviewee stressed the need for people to turn information into knowledge - "*The knowledge for me, is like gaining access to the relevant information at the right time. So the right person, the right information at the right time can turn into knowledge.*" (TelCo-Int1) This statement emphasises both the relationship between information and knowledge and how a person can turn the former into the latter and also the importance of access to information (and by inference data) to enable the development of knowledge. Another, discussing knowledge management, emphasised the importance of communities and sharing "*I think it's a lot to do about people and communities and sharing*" (TelCo-Int4) - while a third stressed the importance of experience and learning "*so information is something I can probably get my hands on if I can go to the right source and knowledge is something that is less tangible, probably more difficult to source and that is normally driven out of customer experience as well as going through a learning exercise.*" (TelCo-Int2). Most users not specifically involved with knowledge management have not thought about the distinction and there is some suggestion that discussion of such distinctions is unhelpful and that the term 'information' is more meaningful to many people. "*I find calling it knowledge a problem because it's not - it's like companies asking if they can put a plug in your head and suck your brains out and share it and I think it sounds jolly grand but I don't think it's an encouraging expression and a think it actually puts people off because if they can't define it, they can't put their finger on it whereas if you said it was information, I think more people would understand what it was.* […] *I just think this whole reference to knowledge is a problem for people. I think if it didn't sound so "over there" and so intellectual I think more people could relate to it. I think it's simply - I think calling it knowledge management put people off.*" (TelCo-Int3). This statement infers that the average 'user' understands the concept of information while finding that of knowledge more nebulous.

In terms of knowledge perspectives, the approach of TelCo is heavily technology-oriented with a focus on documented knowledge and information. Although there is no formal knowledge strategy, many of the goals seem aimed

at documentation and knowledge retention – the data shows many repositories of information. However, they are also trying to improve the visibility of knowledge and access to it. Organizationally, TelCo is heavily technocratic – *"[...]'s solution to any problem is always technical.*" (TelCo-Int3) – with little effort to encourage knowledge sharing and much more focus on knowledge/information storage. In terms of KM instruments and systems, the focus is on products, like document management, and search "*The idea now is that we have separate search engines for things like the intranet, some structured databases and things like our document management repository*" (TelCo – Int1). Attempts at evaluation are rare and disjointed. "*I know we have tried hard in the past and it was quite difficult to come to some hard measures. We managed to put some together in some specific areas like - you know - like in the area of business travel issues - using knowledge sharing, conference calls, all these things which you can somewhat put under the wide umbrella of knowledge - they can try and - well, you can't measure cost savings really. It is very difficult - or if you can manage to demonstrate that a number of knowledge calls or sharing information for tools and save some training - that's also a way of demonstrating yet. But I don't... - or I haven't seen to date formal measurements in other areas, you know."* (TelCo-Int4). Overall, knowledge management in TelCo is heavily technology-oriented.

Measurement

At the corporate level, one interviewee mentioned some effort going into measuring the effectiveness of knowledge sharing. A new group has been brought in to look at it, but there is some cynicism from the KM professionals – "*There is a group […] They have now been brought into the business and they have come in and they are part of this team who are doing this collaborative stuff with me and others and they are quite gung-ho about coming up with benefits - I sit there and smile! I wait to see what they come up with!"* (TelCo-Int1). So far it has been unsuccessful. "*To be brutally frank, I don't think you can. We've tried this for years*." (TelCo-Int1) – implying that those directly involved with KM are aware of the problems of measuring intangible benefits. The other interviewee involved with corporate KM had no knowledge of this initiative and felt that there were no efforts at measurement. Various things are measured but it is felt that it is hard to relate

them directly to knowledge management or sharing. "*I know we have tried hard in the past and it was quite difficult to come to some hard measures. We managed to put some together in some specific areas like - you know - like in the area of business travel issues - using knowledge sharing, conference calls, all these things which you can somewhat put under the wide umbrella of knowledge - they can try and - well, you can't measure cost savings really. It is very difficult*." (TelCo-Int4). In other words, they measured cost savings which may or may not have been attributable to some extent to sharing knowledge or information.

One particular project involving the provision of information / knowledge to help desks has produced very significant improvements. "*What we have been doing is measuring through a test and control environment the impact on call handling time which is one of our productivity measures and which is also a cost measure - of the impact of applying knowledge management in cases where … and then doing a test and control evaluation where we don't have it. And what we have seen is a reduction in call handling time for those people who are actually using both content management and knowledge management to share and distribute information to others."* (TelCo-Int2) However, despite what this interviewee says about "*the impact of applying knowledge management",* this project involves technology and training as well as the sharing of knowledge and information and no attempt has been made to analyse different contributions to the improvement.

In summary, KM workers understand 'data-information-knowledge' concepts, but feel it is irrelevant - and probably unhelpful - to users. There are currently no efforts to measure the benefits of knowledge sharing in any quantitative way but there is evidence of the overall success of some projects that involve improved information sharing, but they involve technology and training as well.

Linkages

The absence of any KS or KM strategy implies that there is no internal drive for alignment and such areas of alignment that exist do so because of other drivers.

The lack of strategy affects technology in terms of a lack of standardisation: *"Somebody who has got some money might build their own little sharing tool and then*

you'll have tools for sharing knowledge among certain groups of people that aren't available to the company as a whole" (TelCo-Int3); *"A long history of - like a Maoist philosophy - let a thousand flowers bloom - who controls the budget buys whatever they want to buy*" (TelCo-Int1). Similarly, the lack of strategy sometimes means that those trying to drive knowledge management sometimes have to resort to very basic approaches – *"So we are talking to people at, like, the middle layer in the company in these different lines of business to say 'what do you want from collaboration' sort of stuff. And then it's got to be a selling point above that to the senior management to get senior sponsorship."* (TelCo-Int1). Finally, this lack of strategy means no top level process for knowledge management: "*No, I don't think there are [any top level processes]. Because we don't have that overarching strategy in place and we don't have policies or anything else.*" (TelCo-Int3).

There is some evidence however, of some linkage between processes and 'people'. In some areas a feedback process helps to motivate users to share, "*Each piece of feedback gets a unique identifier so the individual has a [...] that they can track and see what is happening to their feedback. There is a dedicated team of people who handle that. They then make sure that it is structured in a way that meets our contents strategy - rather than simply free form text - it then goes back for validation and in for publications. But at any time the person who submitted it can track it.*" (TelCo-Int2). In another area, annual appraisals look at the employee's level of collaboration – "*We have this appraisal process, obviously internally, and you are appraised every year. One of the things that you are measured against is your collaboration with other people and your sharing."* (TelCo-Int1). There is also an initiative to build a process which forces some level of sharing at the level of document metadata "*The idea behind this is that documents produced by people as part of their day jobs - knowledge workers - will be storing stuff into the document management system and it is integrated to Word and all the rest of it so that it becomes part of the process of generating documents."* (TelCo-Int1). This process could also have some effect on technology and another interviewee felt that this was not unusual for lower-level processes – "*I actually think the processes drove the technology … I'm technology agnostic in many ways. These are the business requirements, this is the processes that they need to operate to - build me something that does it*" (TelCo-Int2).

Overall, the lack of any strategy prevents any serious attempt at alignment at a higher level. However there are signs that lower level processes link people to motivation and to technology. There appeared to be no linkages with structure although, as mentioned earlier, at least one interviewee felt that structure was irrelevant to knowledge sharing.

4.3.3 TELCO SUMMARY

The case study suggests that this organization has neither an overall strategy for knowledge sharing nor anyone with board level responsibility for it. There is little to motivate people to share and processes only support knowledge sharing by chance. There is an enormous level of technological capability but most of it is directed at data and information sharing.

These results are compared and contrasted with the survey results in 6.2.

There is no managed attempt at alignment due largely to the lack of any central strategy. Some alignment does however appear between low-level processes and motivation and technology but there is little evidence that this is widespread or deliberately planned.

4.4 LawCo – Law Firm

LawCo is a large provincial law firm based in the South West of England. It is a limited liability partnership with over 60 partners, 200 other lawyers and a total staff of around 600. Most of the lawyers are fee-earners – i.e. they bill the great majority of their time to clients. Others are supporting lawyers. Amongst these are the Professional Support Lawyers (PSLs) of which there are one or two in every department. They appear to form a hub for knowledge sharing as everyone goes through them for assistance with finding information and data. The current Head of Knowledge Management is an ex-PSL.

There does appear to be a corporate understanding that their people are important. They have been voted as one of the top five best UK law firms to work for and their corporate advertising emphasises that their staff are their most important asset and that they like to make sure they stay with the company for much of their career. Their website includes a news item (January 2008) about a knowledge management system upgrade along with a number of other mentions of KM emphasising that the effective management of legal knowledge is key to the delivery of a quality legal service. They comment that their lawyers are supported by a team of Knowledge and Information specialists backed up by KM Partners, who all ensure that their lawyers are kept well informed and up to date in their chosen areas of practice. (There were no KM partners at the time of the interviews in 2005; however, there is now a partner responsible for KM and a KM strategy in place.) They also emphasise the efficacy of their KM/IS online systems. All of these comments indicate an understanding at a corporate level of the importance of knowledge to the organization.

LawCo returned 31 responses to the survey.

4.4.1 LAWCO INTERVIEWEES

Six employees were interviewed in June 2005.

The first (Int5) was a partner in the Tax and Trusts department who has been a partner for nearly 20 years. He was very aware of the importance of knowledge sharing and was extremely supportive of any efforts to improve it.

The second (Int6) was the KM Coordinator (now Head of KM). This lady was an experienced PSL who had taken on the role of KM coordination. She was involved in a number of KM initiatives outside of the organization and was taking a professional approach to learning all she could about knowledge management. This was recently recognised by her winning the Legal and Technology Awards Regional Knowledge Officer of the Year.

Third (Int7) was a newly-qualified lawyer who had been a trainee with the firm and had qualified about 2 years before the time of the interview and was now a fee-earner. She was not directly involved with any knowledge management activities other than as a user of the services.

Fourth was the training manager (Int8). He was responsible for the provision of all training on information systems. As such, he had a good understanding of the training required by lawyers and how it could help them share knowledge and also of the difficulties of getting the lawyers to allocate enough time for such training.

Fifth (Int9) was the Administration Manager who had been there for around 15 years. In the early days, he had run everything except finance – including marketing and IT – but now was primarily responsible for the building, the services and all of the support staff.

4.4.2 LAWCO CASE DATA

Strategy

Knowledge is fundamental to the organization - "*It is the most important thing possible to any legal practice. Without knowledge, we've got nothing*." (LawCo-Int7) says a partner. Not only is knowledge vital, but so too is access to information "O*f course you can't be a good lawyer unless you have access to all of the sources of*

knowledge but much more than that, the expectations of clients are now much, much higher than they ever used to be so you have a corporate client - they will expect everybody who works for that client to know everything that has happened. Say there is a change of managing director in that organization - they would expect every person in the legal practice to be aware of that. So it is important for business development. It's also important for the client relationship in the sense of delivery. All of the technical things like, when were you last in contact, do you hold any of their money, how much time have you spent doing this that and the other." (LawCo-Int7) Despite this, there is no formal strategy for knowledge sharing or knowledge management although there does seem to be work going on to develop one although it is being driven by the KM Coordinator rather than by a senior manager or partner. Interviewer: "*Is there currently a strategy for sharing knowledge in existence at the company or strategic level*?" Interviewee: "*There isn't now, but there might be tomorrow. We've got quite a detailed strategy now and I think it will get through*" (LawCo-Int6). Even at the level of the junior lawyers, there seemed to be knowledge of this initiative. Interviewer: "*Do you think there is any strategy in the organization for sharing knowledge?*" Interviewee: "*There is a definite attempt.*" (LawCo-Int9). One interviewee did suggest that there were strategies for information - "*There isn't a strategy exclusively around knowledge, I would say. There are a range of strategies about different types of information and how those are accessed. But I wouldn't say that anybody has ever come in and said 'Right, that knowledge management is key. Let's have a strategy designed around that'*." (LawCo-Int7) However his lack of understanding of terminology coupled with his inconsistent use of words, both of which were apparent during the interview, suggest that he was more likely to be referring to processes than to strategy.

In summary, there was no knowledge strategy although the KM Coordinator – a middle-ranking member of staff – was trying to put the case for one and there seemed to be an acceptance at a senior level that one was necessary.

Structure

The organization of the firm was felt to hinder knowledge sharing between departments although sharing within departments is quite good. "*I think that … being divided up into departments can create barriers. It's good in that it creates communities of interest and so you are encouraging exchange by keeping people of a similar interest geographically close but it can create barriers.*" (LawCo-Int6) There were many mentions of 'the silo mentality'. *"[The Managing Partner] is forever railing against the silo mentality that we have*." (LawCo-Int8) This silo mentality means that discovering what others are doing is a hit and miss affair. "*I happen to be chatting to the property lawyer and this chap wandered over. So we got chatting - 'so what are you working on at the moment' and the commercial lawyer said 'God, I'm trying to get into […] and get some business out to them and I'm just not having any luck' and the property lawyers said 'God, they've been clients of mine for two years'. And so suddenly, magic, and great, we were in but he was just so ad hoc and informal I just thought we'd got to get better at this*." (LawCo-Int8) This statement suggests that there is a significant lack of customer relationship management (CRM) across departments. Even within the same department, chance plays a significant role in bringing together similar interests: "*They'd both come into my room to ask for the same material and it was only because I was asked twice by these different people I was able to say it 'Oh, John Smith is doing that and [...] is doing that - why don't you talk'. That's the sort of thing you can miss quite easily if you get too confined in your own department*." (LawCo-Int6) So even within departments, the lawyers seem to have little knowledge of what each other is doing. In addition, each department has a variety of types of staff and they don't all share as well as they could. "*We have lawyers, secretaries and admin in almost three separate camps, and again, there's often a bit too much of a them and us mentality and so that doesn't help.*" (LawCo-Int8).

Overall, although sharing took place within departments, there was little but chance to make it occur between departments.

People

One interviewee felt there was some desire to share amongst people - "*people are motivated to share because people want to help each other … You see that a lot, you know, people going to other people and saying 'I've got to do this' and other people will say 'I've done this', or 'I've done that before - here you go'.*" (LawCo-Int9) and this statement also shows that *who* you know is important. However, this desire to share is tempered by the focus on time. "*If I come on a three hour Excel course, I'm going to have to work till 9 o'clock tonight*" (LawCo-Int8) This fixation with chargeable time is a problem in this firm. Booking time to a client is all important – indeed there are targets to be met. Anything that falls outside of that has a very low priority and this includes things like making what you have just learnt available to other people. The firm is aware of this problem and has brought in the concept of 'investment time'. This is an 'account' that time can be booked to legitimately for such things as knowledge sharing. However it still isn't considered nearly as important as 'real' client time. "*Well I'm not belittling investment time in that, you know, if you got something genuine, you can put it down - I'll go back and it'll be there - and I know they look at that. But I just think it's the fact that there is such a day - It is just an unfortunate thing that people say 'oh, that's non chargeable and I got to spend four hours doing that' and it's that kind of thing that doesn't help."* (LawCo-Int9) There is also the problem that if you charge by the hour, then there is not a great motivation to do things faster "*You work on it and the longer it takes the more you get paid to do it. Now that is not a huge incentive to start doing things quicker! And the problem is that the whole idea of creating know-how is that 'this is one I did earlier and because I did it earlier I can now do it a hundred times faster than if I was doing it fresh' and then I get less money!*" (LawCo-Int5)

The negative aspects of this focus on time are not countered by any great motivation to share. "*I don't think that at the moment there is enough of an incentive to somebody to actively either help generate the know-how or indeed make sure that they use it*" (LawCo-Int5). Indeed, job evaluation is based largely on income, "*I think at the moment - we tend to revert to measuring people by how much income they have brought into the firm*." (LawCo-Int5) although there is some realisation at a senior level that a wider level of appraisal might be advantageous. "*One of the things that*

perhaps should be introduced and which isn't present at the moment is in the appraisal system for staff. To have some sort of item on knowledge management but there is nothing like that." (LawCo-Int7) Despite this view that it might be a 'good thing', there is nothing actually being done about it. Even though the measures of bookable time are spread over a year, lawyers are constantly conscious of the targets, especially at the more junior levels: "*It's an overall year - yearly target that you've got but to do that you know you have to get say six and a half hours of chargeable time down a day. So you know that at the end of the week if you've not done that each day you going to somehow have to make that up. And I think that does contribute - maybe whether it is conscious or unconscious - but it's a difficult thing with our profession because your time is what you are charging for but then there are all these other things that you could do, but people - it is hard, and people - so - well - six and a half hours in a day - it's not that long - surely that's easy between nine and six but is not - to actually get all that time down - you take out the time taken for tea and things like that and suddenly you can be in it from eight till eight and still had just got six-and-a-half hours. And you think, 'how is that possible'? But because you have to be so conscious because you're charging into a particular client - you know, it's a person who is going to ask you to justify that bill at the end of the day*" (LawCo-Int9). This problem did not seem to be perceived at the more senior level who, having instigated 'investment time' did not see this lack of motivation to use it productively.

Despite their 'Know-how' and 'Precedent' indices, many people do not seem to think about recording 'knowledge' to use it again. "*There is a system for storing but where it falls down is that very few people actually think, having done something, 'Ah - that would be of use to other people'. They tend to think that was a unique situation particular to that client - great to have resolved it, but it's never going to be of any use again to anybody and therefore never get stored anywhere*." (LawCo-Int6) Once again this indicates the lack of thought about formally 'learning from practice'.

Training can help get knowledge shared particularly when it encourages discussion. "*It sometimes actually prompts an exchange of knowledge. The best training sessions are the ones they end in a flurry of questions and perhaps somebody offering to go and research a particular point. That's real knowledge sharing.*" (LawCo-Int7) A

recognition here that getting people to talk to each other makes for 'real knowledge sharing'.

In summary, there is possibly some desire to share but it is overridden by the fixation on billable time. This problem is understood and some solutions have been tried but without any significant success largely because booking billable time looms so large for lawyers – it appears to be their greatest driver.

Process

This is not a very process-driven organization except at a basic administrative level where a few processes are being used in places for such things as standardising the opening of client files. These processes may occasionally support knowledge sharing, but only by chance. There is certainly an awareness among KM people that there are opportunities here – "O*ne of the business processes we are putting in place first is automated file opening. At the moment this is very much to speed up file opening to enable us to charge sooner. I can see all sorts of opportunities for feeding in something - perhaps for file closure if we had a process for that - you cannot put a file away unless you have scanned it for knowledge and thought about the talk you ought to be giving off the back of it. So it will help us to build in triggers for people to think about knowledge sharing*." (LawCo-Int6) – although it is unclear what mechanisms, if any, are available to try and make it happen.

Technology

The technology is focussed on providing access to repositories of information, primarily a precedent index and a 'know-how' index. Development is led primarily by the IT group often with little input from users. This lack of involvement is not necessarily the fault of the IT group as many of the lawyers are so busy that they do not want any involvement.

The older generation of lawyers are not very IT literate and generally will not use the systems. "*If I have got to launch out into the unknown myself, then that is where I start to flounder and I immediately abandon it and ask somebody else to do it because the*

very bright 25 or 30 years old lawyers who are coming through have always used the internet so they know precisely how to get a piece of information just like that. And although it would be lovely if I spent two hours getting in, they can do it in five minutes." (LawCo-Int5) This attitude is driven not so much by technophobia as by a realisation that their charge out rates are so high, they cannot afford to 'waste' time learning about IT when others can do it for them.

There is no technology specifically aimed at helping people share knowledge. "Interviewer*: Is there anything around technologically that actually helps people share knowledge?* Interviewee*: [Long pause] Our e-mail system? No, not really.*" (LawCo-Int8)

In addition, the launching of new technology initiatives has also been badly handled in the past with little attempt to sell the benefits to users. "*They put a lot of work into developing this thing and basically, a note went out on Friday saying your new intranet will be live on Monday - go and have a look if you want. And that was it. So it has never become embedded in our culture. It is not a resource that people naturally think of going to.*" (LawCo-Int8) In addition, there are still significant failings from a user perspective – "*I often find it's impossible to find things. Even when you know something is there - you can't find it. God help me if I didn't even know it was there and was trying to find it*." (LawCo-Int9) This statement emphasises the need for good search facilities. There is also a view that if new technology restricts what a lawyer can do, then they will be reluctant to use it. "*I think increasingly they will find that some of the IT systems will give them less room for manoeuvre and it will have to be applied very carefully because I think there will be - as long as they see, they think it's helpful, the system is actually working for them then I suspect they won't have such objection to adopting it but the second that it comes up with barriers and says 'no, stop, you can't make the next step until you've done a conflicts check with so and so' it's going to be a problem*." (LawCo-Int5) The implication here is that if it makes their life easier, they will use it, otherwise they won't. (This is not, of course, peculiar to lawyers.)

The IT group is powerful largely because of the lack of interest and hence control taken by the senior lawyers. Much of the technology is focussed on information

repositories and there is a history of poor implementation both in terms of meeting users needs and in poor promotion of new systems.

These findings are summarised in Table 18.

Strategy • Despite general agreement that knowledge is fundamental to the organization there is no formal strategy for knowledge sharing or knowledge management. • It was stressed how vital is access to information as well as knowledge and there are some strategies around information and how it is accessed. • Work was in place to develop a strategy, but it was not driven at a senior level.
Structure • The company is organised into departments which was felt to hinder knowledge sharing between departments. • Sharing within departments is quite good although even there chance plays a significant role in bringing together similar interests. • There were many mentions of 'the silo mentality' which means that discovering what others are doing is a hit and miss affair. • There was a good awareness of the problems of not sharing.
People • There appears to be genuine desire to share amongst many people but it is tempered by the focus on time. • The fixation with chargeable time is a problem in this firm. Booking time to a client is all important and anything that falls outside of that has a very low priority. • The firm is aware of this problem but initiatives to overcome it are only slightly successful. • The negative aspects of this focus on time are not countered by any great motivation to share - indeed, job evaluation is based largely on income brought into the firm. • Most people do not seem to think about recording 'knowledge' to use it again.
Process • This is not as very process-driven organization although a few low-level processes are in place. • These processes may occasionally support knowledge sharing, but only by chance. • There is an awareness among KM people that there are opportunities here.

Technology
• The technology is focussed on providing access to repositories of information. • The launching of new technology initiatives has also been badly handled with little attempt to sell the benefits to users who also perceive significant failings. • Development is led primarily by the IT group with often little input from users. This lack of involvement is not necessarily the fault of the IT group as many of the lawyers are so busy that they do not want any involvement. • The older generation of lawyers will generally not use the systems partly for reasons of IT literacy and partly because it is not cost effective. • There is no technology specifically aimed at helping people share knowledge.

Table 18: LawCo Summary

Other Areas

Attributes of Knowledge

There seems to be a general appreciation across nearly all the interviewees of the conceptual difference between information and knowledge: "*From my perspective, I think information is - I would say it was something fairly hard and factual whereas knowledge is something slightly more ethereal, if you like and it requires taking information, and doing something with it. Manipulating it or imparting it.*" (LawCo-Int8)

"*In terms of knowledge management - I see that as the people within the firm who know something about that, who've done it , who've written about it or who have been actively involved in it rather than just a piece of information. And knowledge is more a sort of practical...*" (LawCo-Int9)

"*If you accept that the most valuable information is still between people's ears then that's a way of tapping into it and for me I think it turns it from a 2-D piece of information into a 3-D piece of knowledge.*" (LawCo-Int6)

This last is a particularly interesting comment as it suggests a new metaphor for explaining the data – information – knowledge relationship:

1-D = data
2-D = information
3-D = knowledge

This could be useful to any user with a basic spatial or dimensional understanding.

In all three of these quotations, the interviewees are talking about the need for *people* to turn information into knowledge by taking that information and, while it is 'between their ears', 'manipulating' it or otherwise doing something with it. Another interviewee may not have used any of those words but still put across the feeling that there was more to it than just accessing information. "*It's very easy to make sure that everybody has access to last year's Finance Act, that's the easiest thing in the world. But it's much, much more difficult to make sure that everybody has access to a particular discussion that took place about a section of the Finance Act between a member of the firm and a representative of the Inland Revenue. And that extra piece of information is probably the thing that's really important when it comes to delivering the service to the client.*" (LawCo-Int7)

Although they may not use the terminology, they understand the value of tacit knowledge. In particular, there is an understanding that much of what the partners do is almost instinctive. "*I've seen one of our corporate partners price up a deal beforehand. […] he will say - "well this one just doesn't look right, it's going to take three runs of the documentation and I know this particular client is risk-averse -" and he will factor that and come up with a remarkably accurate judgement of how much it will cost in time and he's acquired that through experience."* (LawCo-Int5) The junior lawyer also pointed to this, emphasising that knowledge was practical. (LawCo-Int9 quoted above). One interviewee also understands how easy it is to lose it when someone leaves. "*The tacit knowledge - you only become aware of it when it leaves. Someone else has to pick up the pieces!*" (LawCo-Int8) Perhaps not surprisingly, this was the training manager. No other interviewees expressed any thoughts about knowledge retention or transition which is a surprising omission in an organization so dependent on the knowledge (much of it tacit) of its senior members.

Even though all lawyers are *knowledge workers*, the type and level of knowledge needed does vary across the profession – "*Commercial lawyers fundamentally are deal-doers. So it is much more people skills, I would say, than real knowledge. If you are good at brokering a deal you will be a good commercial lawyer. To be a litigator you've got*

to have a much more analytical mind but you've also got to be able to argue the hind leg off a donkey whether you believe in it or not. To be a tax lawyer, you've got to have a different sort of analytical mind and you most definitely need to have access to all the information - you certainly can't bullshit your way through it as you can as a commercial lawyer!" (LawCo-Int7).

In terms of knowledge perspectives, LawCo uses technology together with an understanding that knowledge resides in the individual. The perspective is one involving both engineering (from the IS point of view) and community. Although there is no formal knowledge strategy, those driving KM are working towards improving the use of tacit and explicit knowledge and encouraging sharing within the culture – "*I think within a department - where there is a team ethos that works well, then the people are motivated to share because people want to help each other and I think that motivates people. You see that a lot, you know, people going to other people and saying 'I've got to do this' and other people will say I've done this, or I've done that before - here you go."* (LawCo-Int9).

The roles that exist span both codification and personalisation approaches. 'Boundary Spanners' in particular exist in the form of PSLs – "*Every single piece of know-how goes through the PSL or a know-how administrator before it gets on to the system and that's quite a controlled band of people*" (LawCo-Int6). Knowledge portals are also under development. In terms of knowledge management systems, both document management systems and knowledge communities are in use.

Any signs of evaluation are restricted to measuring the usage of the Know-How Index and the Precedent Index – "*We do have access to things like how often precedents are used and how often a piece of know how is targeted. The precedent information can be quite granular. We can find out not only if somebody opened a precedent but whether they applied it and how. So that's quite interesting but I don't think we've quite worked out how to use that information other than to say "gosh, that precedent was used a lot. We'd better make sure that's up-to-date. So measuring and working out whether it's working - I think it is anecdotal*" (LawCo-Int6).

Overall, LawCo is generally in the boundary spanning camp apart from the area of evaluation where what little measurement there is appears to be mechanistic.

Measurement

Throughout the firm, they tend to refer to knowledge as 'know-how'. They have a 'Know How' index and a 'Precedent' index both of which are computer based repositories of information. "*One of the problems with our grand IT scheme of things at the moment is there has been no time to maintain the know-how index or precedent index which are the core knowledge collection and access machinery for us. We know they are only the tip of the iceberg in terms of knowledge sharing and what appears above the water is what we have collected - it's very easy to measure whether people are accessing those. But below the water is the mass of knowledge that is in people's heads and whether they are talking in kitchens or in passing in corridors and sharing that knowledge is much harder to assess*." (LawCo-Int6) This statement confirms the interviewee's understanding that there is more to knowledge than just a computer information store. They can measure the use of that, but not the knowledge that is shared informally. There is thus no formal measurement of the success of knowledge sharing. "*I would like to think that our system works but no, there are certainly no indicators or measures.*" (LawCo-Int7) However there is an acceptance that knowledge management matters even if you do not measure its outcomes. "*Fortunately, culturally, there's just an understanding that it is good for you rather than that we can prove it on the bottom line."* (LawCo-Int5) As mentioned above, they do now measure the usage of their various databases although this is a relatively new initiative. "*I think only recently have we started to measure who's using which bit of know-how - who's using it and how often*." (LawCo-Int5) They are also only beginning to think about making use of this information. "*We do have access to things like how often precedents are used and how often a piece of know-how is targeted. The precedent information can be quite granular. We can find out not only if somebody opened a precedent but whether they applied it and how. So that's quite interesting but I don't think we've quite worked out how to use that information other than to say "gosh, that precedent was used a lot. We'd better make sure that's up-to-date. So measuring and working out whether it's working - I think it is anecdotal*." (LawCo-Int6). This statement suggests that there are a number of areas where useful measurement information could be used to maintain accuracy and/or quality.

In summary, there is a general appreciation across nearly all the interviewees of the conceptual difference between information and knowledge even though they may not use those words. Similarly, although not always using the terminology, they understand the value of tacit knowledge and how easy it is to lose it when someone leaves. Throughout the firm, they tend to refer to knowledge as 'know-how'.

There is no formal measurement of the success of knowledge sharing. However there is an acceptance that knowledge management matters even if you do not measure its outcomes. They do measure the usage of their various databases but they are only beginning to think about making use of this information.

Linkages

As with TelCo, the lack of any knowledge strategy poses problems. There is no one senior in charge of knowledge management and the partners don't seem to want one "*There was talk of creating a director of know-how but the partners, for whatever reason, and I wasn't privy to the discussions just didn't go for it - they didn't buy into the idea and it's sort of subsided.*" (LawCo-Int8). One interviewee suggested that it was decentralisation that made it difficult for the KM Coordinator to work – "*We're a very decentralised firm really. Central management is kept to the minimum. […] The downside [...] it makes it much more difficult for that sort of structure to have centralised know-how and that is a minus of a very decentralised structure. I think we recognise that and it does mean a role like [name]'s is a tougher one - because her title is co-ordinator - she daren't even take on a title of director because it would suggest to departments that she is now going to tell their professional support lawyers how to operate - so the whole thing is done by negotiation. And that is tough"* (LawCo-Int5). However it isn't the decentralisation that causes the problem, it is the lack of power and status due to the coordinator being at a middle management level. Everyone is aware that this is a knowledge organization – "*We're a knowledge based organization. We sell applied knowledge. It's absolutely critical, it underpins everything we do."* (LawCo-Int6) – but the focus on client bookable time seems all-consuming.

Technology is largely disconnected from other areas. "*IT are very well-meaning, very ambitious. They just don't understand the changes they make for very good technical reasons need to be talked through with us to understand what the implications for the culture - for knowledge sharing and for information exchange will be. It's a big gap at the moment. […] I think that the gap between systems and reality is quite large at the moment and I think the PSLs and knowledge management team have to help bridge that gap*" (LawCo-Int6). There are other examples of this disconnection, but it seemed that the blame for this could not be entirely laid at the door of the IT group. They articulated their ideas and proposals, but the lawyers were too busy to bother looking at them in any detail. The disconnection between people and technology was greater at the senior level. "*That's where some of the partners are stepping outside their comfort zone - they have done interpersonal knowledge exchange for years and they are comfortable with that and they're worried that that is going to disappear*" (LawCo-Int6). Processes can also conflict with the culture in that senior lawyers like to do what they want, not what they are told – "*The herding of cats analogy is right - they do not like to be systemised. At times I'm sure it is to their disadvantage but, you know, in practice we spend a lot of time and effort producing standards in terms of engagements which should be used, money laundering procedures and it's a devil to persuade lawyers to stick to them*." (LawCo-Int5)

On the positive side, there is an awareness of the structural problem of communication between departments and, in a few cases, a process approach is being used to try and break down barriers: "*I'll give you a very simple example. When a lawyer produces a bill - something very dear to his heart - he and his secretary work together to produce the bill. It's produced in paper form and printed out and the lawyer signs it off. It's then sent through the internal post to our accounts people who will then process the bill and put it on the system. If there is a mistake on the bill, because we only have a small accounts team, they don't have time to manually amend or call up the bill on the system and make the changes. There just aren't enough people there to centralise that function. So what they do - it's like being back at school - they get a red pen and they write on the bill the mistake and stick it in the internal post - which takes the best part of the day - and send it back to the lawyer. The lawyer, when he gets this, goes up the wall because he's probably told the client that the bill will have gone out by this time, he's made*

to feel like a naughty schoolboy and it's just astonishing. But no one had thought to go back to accounts and say 'and this is annoying the hell out of us - is there anything we can do about this?' and it took project Genoa - basically we got some lawyers in a room and some billing staff in a room and said 'Right, how can we resolve this?' and what's happening now is that billing still don't have enough staff, so we are doing two things: billing are now picking up the phone to a secretary and saying 'this is wrong, it needs changing to this, can you do it?' and the secretary makes the change. So straight away we've cut down the thing coming back with the red pen and the delay in the internal post. The second thing we are doing is running training to attack the symptom as well as the cure. So we are running some training for lawyers on how to do bills to stop them making mistakes in the first place. But it took this project just to get them talking to each other." (LawCo-Int8) This is a very good example of someone noticing a problem and then putting a process in place to try and mitigate it.

Overall, the lack of any guiding strategy coupled with the leading role of the technologists prevents all but a few areas of alignment.

4.4.3 LAWCO SUMMARY

Knowledge sharing is absolutely fundamental to the operation of this company. Despite this, there was no formal strategy or partner-level responsibility for knowledge sharing. Work was in hand to develop a strategy, but it was driven from a middle level of management.

There appeared to be a general desire to share but this was tempered by a fixation with maximising the time booked to clients and there were no motivational factors to counter this. The firm has few processes in place as lawyers seem to expect the freedom to operate in their own individual ways. These few processes sometimes helped information or knowledge sharing but only by chance. Technology is focussed heavily on providing repositories of information.

These results are compared and contrasted with the survey results in 6.2.

The lack of a centralised strategy emanating from a senior level prevents any significant alignment. Technology is driven strongly by the IT group, but a lack

of interest and involvement by the lawyers often causes a mismatch between systems and needs.

4.5 PUBCO – A PUBLIC SECTOR SUPPORT ORGANIZATION

PubCo is a 'non-departmental public body' tasked with the improvement of IT solutions in large public service organizations and with the provision and operation of very large databases of data and information. In 2007, the company was subsumed into another government agency and thus there is no current website. A copy of the 2005/2006 annual Report and Accounts was obtained and this makes no references to knowledge management, knowledge sharing, or indeed to the importance of staff or their knowledge. At that time its turnover was around £300M and it employed around 550 people.

Despite numerous promises to promote the survey within this organization, no responses were received.

4.5.1 PUBCO INTERVIEWEES

Four members of staff were interviewed in January 2006.

First was the CEO (Int12) who was extremely knowledgeable about KM matters due to a previous senior position (in the Defence Evaluation and Research Agency, later Qinetiq).

The other three were directors, none of whom were specifically involved with knowledge management. The first (Int10) had responsibility for an area involving a number of extremely large database systems providing vast amounts of information nationwide on a daily basis. He was a scientist by background.

The second director (Int11) was responsible for looking at future directions.

The last (Int13) was an ex-senior police officer responsible for a number of major operational projects.

4.5.2 PUBCO CASE DATA

Strategy

There is a strong focus in this organization on the management of information and there is thus an information management strategy in place rather than a knowledge management one. As the CEO says, "*There is an information management strategy. The word knowledge doesn't actually feature a great deal in that."* (PubCo-Int12). Another interviewee agreed that there was no knowledge strategy but acknowledged the existence of an information strategy, albeit with a rider… "*… not that I am aware do we have a true, certainly not a documented knowledge strategy. I think the nearest we come to it is an information management strategy and that's fairly embryonic as well.*" (PubCo-Int11). The other two interviewees felt there was no knowledge strategy and made no mention of an information strategy. "*A strategy for sharing knowledge - not really, No.*" (PubCo-Int10). Interviewer: "*Is there, as far as you are aware, a knowledge strategy or a strategy for sharing knowledge within […]?*". Interviewee: "[Long pause] *difficult to answer - information - I know we try and share information. Knowledge - not that I am aware of.*" (PubCo-Int13)

In summary, no knowledge strategy and a poorly promulgated information strategy.

Structure

At the level of small teams, the conditions for knowledge sharing exist. "*We do come together as various teams - either everybody together or in terms of team meetings coming together to share - share information and with that share knowledge. It doesn't necessarily force the sharing of knowledge, but it allows the sharing of knowledge and I think that might be an interesting distinction.*" (PubCo-Int10) Overall however, the larger structure of the organization did not help sharing. "Interviewer: *Does the structure of the organization support knowledge sharing?* Interviewee: *No.*" (PubCo-Int11) "*I wouldn't say it helps particularly. Having said that, I'm not sure if there is any structure that would help any more*." (PubCo-Int10) This respondent continued by suggesting that sharing across groups is always difficult whatever way the

organization is structured. "*You can cut organizations in a number of different directions, whichever way you cut it, you have to have some divisional or separate responsibilities, separate lines of reporting, separate lines not just of personal reporting but of project reporting and at some point they come together. […] which ever way you cut it, you will have difficulty communicating in the other directions*." (PubCo-Int10) This was felt to be an inevitable problem in larger organizations. "*The fact is that any enterprise, whatever people say, tends to become stove piped because you structure something and therefore people tend to mix with the groups they tend to operate in, in which case by the very structure it tends to militate against you sharing across the structures*." (PubCo-Int12)

Other interviewees agreed that the structure did not support knowledge sharing but that this was realised and some initiatives to try and mitigate it were in place. "*We've recently started what we call job shares for technology awareness - having lunchtime sessions for staff saying this is what this particular project does - it's to get more knowledge of what we are building out to a wider part of the community.*" (PubCo-Int13) In addition, more formal sessions have been held to spread an awareness of what is happening across the organization - "*We've had a thing recently - trendy title was a "Share Fair" - I'm not quite sure why we called it that but I think it was the sharing of knowledge because people are so blind to a lot of what happens in this organization and there were a number of sessions […] at various points in the day - on - to just get people from other bits of the organization to come and chat about what they were doing and what they had learnt and everything else. They were extremely popular - extremely well-attended.*" (PubCo-Int11) The fact that these were so popular does suggest that there is a desire amongst people to know about the areas in which others are working and spreading this knowledge of 'who to ask' is a positive step forward.

Overall, the structure was not considered to be helpful to knowledge sharing but this was realised and some small effort, in the shape of Knowledge Fairs, had taken place to try and mitigate it. Structural problems were considered inevitable in large organizations.

People

Looking at the *people* aspect of knowledge sharing, most respondents agreed that people were not averse to sharing, but that there was little to motivate them to do so. No one is measured in any way in terms of knowledge (or information) sharing and thus those things on which they **are** measured tend to take priority. "*I definitely feel that there is a willingness and motivation to share knowledge - definitely.* [Long pause] *but the workloads of the day and being measured against progress, as it were - then one is really up against it and one tends to really focus on what one has to do and what the individual has to do rather than seek to share something with somebody else. Knowledge has to be pulled in that environment rather than it being proactively pushed*." (PubCo-Int10) The bottom line here is that spending time on sharing knowledge is felt to be a luxury that they cannot afford. "*When push comes to shove I'm being judged on whether I've delivered my programme and if I haven't got time to go and chat to the others that's actually not going to be any skin off my nose*." (PubCo-Int11)

The organization has a cross-divisional team in place to find and record lessons learnt. It works throughout the organization but the knowledge collected is not often reused. *"We do have, for example, a very thorough, certainly in many of the areas, uniform approach to lessons learnt and there's a big process - there is a team that comes out and do lessons learnt on most of our major projects and do a very good job on it, document it all nicely and I ensure they're all on a shelf gathering ring binders but people don't seem to have managed to grab the facility to get them off the shelf or more importantly, to consolidate that growing knowledge - it's against the silo mentality of a project by project basis*" (PubCo-Int11) Once again, there appears to be no motivation to make anyone reuse this collected knowledge. Another interviewee agreed that there was little to make anyone build on the lessons learnt. "Interviewer: *So if you are project manager on a new project, is there anything to make you go and look at previous lessons …* Interviewee: *Does somebody stand over you and force you to read something? - No! Is it considered best practice that you ought to do that? - yes*. Interviewer: *Does it happen?* Interviewee: *No!* [laughter]" (PubCo-Int10) The same interviewee later slightly contradicted himself by suggesting that some motivation might come from a desire to save time "*So I would have said that the motivation is more … more on the basis of 'why go to all the trouble of inventing this - let's find out how somebody else*

has done something'." (PubCo-Int10) There was also a feeling that lessons learnt were perceived as something negative, a record of things gone wrong, and thus to be avoided. "*Lessons learnt are always looked at in the negative and it's always 'let's look at project X and project Y to make sure we don't do that again' and I think - no, 'look at the other end of the scale let's learn a lesson from project A and project B that came through on schedule and to budget and nobody ever gets any flak for!' And it is frequently, lessons learned are a bad thing - let's avoid it*." (PubCo-Int11)

In discussing means of motivation, one point mentioned was the inability to reward people specifically in the public sector. "*And another, I think, limiting factor that is seen in the public sector is that private industry - you've got a high flyer, you can reward him - public sector, you can't.*" (PubCo-Int13) This is due to a rigidly hierarchical system with fixed pay scales offering little flexibility for individual reward. Despite this, another interviewee felt that recognition rather than money was a prime motivator of sharing knowledge. "*What I think you do find though is that the biggest driver in professional organizations of knowledge workers is peer acclaim*." (PubCo-Int12)

In summary, there was little to motivate people to share as there was neither any recognition nor reward for sharing.

Processes

The organization does have a number of business processes in place which do involve spreading information - "*They are all trying to get information to a vast number of people to get some degree of consistency in how we work or use a particular product or jobs that we do.*" (PubCo-Int13) However there are no processes specifically aimed at knowledge sharing and there also seemed to be some doubt as to how well processes were followed. "Interviewer: *Are any of them explicitly about sharing knowledge?* Interviewee: *No. That's why I was careful when I said - they are not - they are certainly not complete. And then again I will climb down a step from knowledge - there are facilities for sharing information. I don't think the processes for those - they are certainly not enforced and I don't think they are all clearly defined*." (PubCo-Int11) There was a feeling that these business processes were at least likely to

enhance information or knowledge sharing, if only by chance - "*But in all business processes - a process by its very nature goes through a chain […] and as it goes through the chain, knowledge is shared*." (PubCo-Int10).

There are no processes for knowledge retention or transition and it appears that no prior thought goes into this area – "Interviewer: *If somebody with a lot of important knowledge either because of their seniority or technical expertise is known to be leaving or approaching retirement or whatever - is there any system for trying to get that knowledge out of them?* Interviewee: *No - abject panic!"* (PubCo-Int13)

It was clear from talking to the interviewees that this was not really a process-driven organization and they all appeared to have slightly unclear views on what processes were. What processes there were may have helped knowledge sharing by chance, but there was doubt as to how well they were followed.

Technology

The technological focus in this organization is firmly on data and information sharing with no tools aimed specifically at helping people to share knowledge. When asked about technology, there was a noticeable dislike of email. "*E-mail, I believe is a huge constraint on getting things done! It is a wonderful facility, but so appallingly abused in this day and age that it has a detrimental effect.*" (PubCo-Int11) "*I think it is too easy to misuse it - yes. It's too easy to send without thinking - too easy to reply to everybody*" (PubCo-Int10) This would suggest that their use of email is perhaps undisciplined and in need of user training.

The CEO commented that in his previous organization, he had instituted a 'Directory of Experts' where the people in it were rated by their peers rather than by themselves so "*it wasn't how you ranked yourself, it was how other people ranked you*." (PubCo-Int12) He had found this very successful and useful, but had not yet tried it in this organization.

Almost all the technology is focused on data and information and there appeared to be no plans to improve the technology in terms of enhancing knowledge sharing and this is probably due to the lack of any strategic focus on KS.

These findings are summarised in Table 19.

Strategy • There is no knowledge strategy in place. • There is a strong focus on the management of information and there was thus, it was claimed, an information management strategy in place. • This information strategy was either unknown to most interviewees or considered embryonic.
Structure • At the level of small teams, the conditions for knowledge sharing exist. • Overall, the larger structure of the organization was not considered to help sharing. • This was felt to be an inevitable problem in larger organizations. • Although the structure did not support knowledge sharing, this was realised and some initiatives to try and mitigate it were in place such as a 'Share Fair'.
People • Most respondents agreed that people were not averse to sharing, but that there was little to motivate them to do so. • No one is measured in any way in terms of knowledge (or information) sharing. • Spending time on sharing knowledge is felt to be a luxury that they cannot afford. • The organization has a cross-divisional team in place to find and record lessons learnt. It works throughout the organization but the knowledge collected is not often reused. • There was a feeling that lessons learnt were perceived as something negative and thus to be avoided. • The inability to reward people flexibly in the public sector was mentioned by one interviewee. • The concept of recognition rather than money as a motivator for sharing was suggested.

Process
• The organization does have a number of business processes in place which involve spreading information. • There seemed to be some doubt as to how well such processes were followed. • There was a feeling that these processes were at least likely to enhance information or knowledge sharing. • There are no processes specifically aimed at knowledge sharing. • No thought goes into knowledge retention or transition.
Technology
• The technological focus in this organization is firmly on data and information sharing. • There are no tools aimed specifically at helping people to share knowledge. • When asked about technology, there was a noticeable dislike of email. • The CEO commented that in his previous organization, he had instituted a 'Directory of Experts' where the people in it were rated by their peers rather than by themselves. He had found this very successful and useful, but had not yet tried it in this organization.

Table 19: PubCo Summary

Other Areas

Attributes of Knowledge

The concepts of data, information and knowledge were well understood by two of the interviewees but not initially by the others although they followed and accepted an explanation. However these latter two did not think that it was a very important distinction to them. One of them then provided a succinct definition – "*Knowledge is more akin to the understanding of the implications of information*" which he then expanded thus, "*My understanding of knowledge […] is the impact that information has and an appreciation of what information is required and what information can be - should be - taken into consideration in terms of decision-making, in taking things forward and how to organise the information in a coherent and intelligent way*". (PubCo-Int10) This definition is in keeping with many others involving, as it does, a person taking action as a result of information.

Another interviewee suggested that 'intelligence' was more important than knowledge. However when he defined the term, it appeared that this was largely

synonymous with the conventional definitions of knowledge - "*Intelligence is processed information. Analysed information. It is value added information and that per se, requires somebody - probably with knowledge - to actually add something to that information. Data is absolute raw-material and is useless in its own right. Information puts it into some sort of context but then it requires a bit more value added to turn it into intelligence.*" (PubCo-Int11)

Overall, there was an acceptance that the organization was largely concerned with information management, but there was an understanding that that was a prerequisite for knowledge management. "*Because of the role we take, most of the role we undertake is about managing information. However, what it does is that it enables […] to manage the knowledge at their disposal more effectively.*" (PubCo-Int12).

The knowledge perspective at PubCo is firmly technology oriented. There is very little differentiation between information and knowledge. There is no knowledge strategy in place and most of the focus is on information management – they focus on acquiring and storing information – "*I stand to be corrected, but not that I am aware do we have a true, certainly not a documented knowledge strategy. I think the nearest we come to it is an information management strategy and that's fairly embryonic as well*" (PubCo-Int11). There are no knowledge communities or skills directories although there is a group tasked with 'lessons learnt'. There were no attempts at evaluation "*We do measure a lot of other things […] but a measurement of are we actually sharing knowledge - I don't think so*" (PubCo-Int13).

Measurement

There are no attempts to evaluate knowledge sharing formally or otherwise. When asked the question, respondents gave the following answers… "*Not that I am aware of.*" (PubCo-Int10) "*No - I don't believe there is at all.*" (PubCo-Int11) "*Not to my knowledge. We do measure a lot of other things [...] but a measurement of are we actually sharing knowledge - I don't think so.*" (PubCo-Int13). It was also clear that the question was a surprise to the interviewees. Measurement was not something that had been considered.

In summary, the concepts of data, information and knowledge were well understood by two of the interviewees but not initially by the others. Two interviewees did not think that it was a very important distinction to them.

There was an acceptance that the organization was largely concerned with information management, but there was an understanding that that was a prerequisite for knowledge management. There are also no attempts to evaluate knowledge sharing in any way.

Linkages

With no strategy for knowledge sharing, there is nothing to motivate people to share. "*But the workloads of the day and being measured against progress, as it were - then one is really up against it and one tends to really focus on what one has to do and what the individual has to do rather than seek to share something with somebody else*." (PubCo-Int10) and neither is there much incentive to make people work to what processes there are – "*We do have a pretty thorough - not necessarily complete, but probably not far off, set of business processes - documented and available. Whether everybody adheres to them is another matter. Whether everybody is even aware of them is another matter."* (PubCo-Int11).

On a more positive note, the use of 'Share Fairs' provides a small link between structure and people by encouraging interchange across departments and the cross-divisional 'Lessons Learnt' team provides some link between structure and process but, unfortunately, then fails to connect with people. (Examples quoted earlier).

4.5.3 PUBCO SUMMARY

PubCo acknowledges a focus on data and information management rather than KM and the CEO claimed that an information management strategy was in place. However, the other interviewees (all director-level) appeared to have little or no knowledge of this. Technology was focussed firmly on repositories of data and information.

There was nothing to motivate staff to share even though people were felt not to be averse to the idea of sharing. Pressure of time was also thought to have a negative effect on sharing.

There were a few processes in place which enhance information sharing and also a cross-divisional 'lessons learnt' team – although there seemed to be nothing to encourage staff to use the lessons so learnt. As a result of all this, there were little signs of alignment.

(This organization did not provide any survey data.)

4.6 PROFCO – A MAJOR PROFESSIONAL SERVICES FIRM

ProfCo is a major professional services firm which operates worldwide although this research only covers the UK operation. This UK operation, a limited liability partnership, has a turnover of around £2Bn and has over 16,000 employees most of whom would be considered knowledge workers. Their annual report makes much of the importance of their people and talks about the company's efforts to nurture their knowledge and experience. The words *expertise* and *knowledge* occur frequently both in the report and on their website as do references to sharing such knowledge and expertise. There are also numerous references to their *knowledge network*. In addition the company invests heavily in technology to support knowledge sharing. The company is thus well aware of the importance of the knowledge of their employees and the value of sharing it.

ProfCo was not prepared to promulgate the survey. However they did provide, under a confidentiality agreement, the results of their own quarterly KM survey which had over 3000 responses.

4.6.1 PROFCO INTERVIEWEES

Five staff members were interviewed in November 2006. All were currently working in roles involved with knowledge management.

The first (Int14) was a senior manager in the firm-wide knowledge management team who had been involved with KM for about 5 or 6 years. Her focus was "*on the people and behaviour side and also facilitating the knowledge management community … the project is very much around the 'how do we embed knowledge sharing behaviours in the business"*' (ProfCo-Int14).

Second (Int15) was a director who was a global project manager of knowledge management projects. He had been with the organization for about 15 years and had been in this current role for the last 4 years. Prior to that, before the implementation of a central knowledge management group, he had been involved with project managing various KM initiatives. This was a telephone interview and a poor line coupled with a very strong accent made this a hard interview to transcribe.

Next (Int16) was a knowledge manager for one of the company's lines of business focussing on medium sized companies. She also had a responsibility for internal knowledge management across 39 regional offices. She had been working in KM for about 10 years.

Fourth (Int17) is a director who leads a small firm-wide team which does three things. They support the knowledge groups, support the KM community with some 70 or 80 knowledge managers embedded in the lines of business and they have responsibility for the intranet portal.

Last (Int18) was a younger manager who had spent her 8 year post-university career so far with the organization. She currently worked in an industry-specific area offering KM support across a number of lines of service and of territories.

4.6.2 PROFCO CASE DATA

Strategy

At the top level of the organization, there is what is, in effect, a knowledge strategy but it is known as a 'knowledge proposition' – "*So we have a framework and an implementation [...] but we hesitate with the words strategy.*" (ProfCo-Int15) This knowledge proposition focuses on culture and behaviours. "*In summary our primary priority is to try and get the behaviours right which includes sharing as opposed to worrying so much about the technology, the structures - organizational structures - or even processes. So it is very much a focus on the people side by sharing and re-using*." (ProfCo-Int17) So all the focus is on behaviours, the view being taken that if they can inculcate a desire to share in the staff and make it a 'natural' thing to do, then this will become a prime mover of any other knowledge sharing initiative or technique.

Knowledge of this 'proposition' seems to be limited to those at a more senior level. When asked about a global strategy, one interviewee commented "*At the highest level? A good question! We've recently appointed a Global CKO who has just joined. He is based in Philadelphia but spends a lot of his time in London as well. Now he joined in April - he's done an initial gathering of information - but whether there is a knowledge strategy that everybody knows about - I personally would say no.*" (ProfCo-Int18)

Support for knowledge sharing appears to be variable. In particular, those at a senior level extol the virtues of knowledge sharing but there seems to be some doubt as to how seriously it is really taken. "*I struggle with this, to be honest - to an extent, on a high level, they understand the importance in that we are a people business - we don't sell a product, we sell people - our people need to know and a lot of what they do - technical information, they have to know the right stuff - they have to be accurate - but - I do wonder if it is really heartfelt [...] and that's something I have struggled with for a while now. Again, it varies from level to level but I would certainly question whether there is a real commitment to it*." (ProfCo-Int18) More problematic is the level of support and enthusiasm from middle management which is much less consistent. "*We get a fair amount of support from the board - I think some of it is kind of passive - they haven't really thought about it but they are willing to give it the benefit of the doubt - some is quite active on the part of a few other people […] as we get down to the next level of people - people who are running Business unit's - 3 or 400 people - really, their views are less consistent and I think some are very for it and some not at all for it. But I think it is that group who influence most peoples views of it because people tend to feel they are part of a group*." (ProfCo-Int17) If this middle level does not believe that senior management is truly enthusiastic and if there is nothing to motivate them otherwise, then they are unlikely to promote knowledge sharing enthusiastically to those below them.

In summary, this organization has a Chief Knowledge Officer and a knowledge 'proposition' aimed specifically at embedding the right behaviours for knowledge sharing. It is promoted by those at the top, but take up is more variable amongst middle management, often due to other pressures on them.

Structure

Small teams are the norm in this organization and so in that respect, the structure of the firm can be said to help knowledge sharing at the local group level– "*I think some of the ways that we work in teams really does help share knowledge. […] Knowledge would be passed from the more senior people on the engagement down to the more junior people and they work on different engagements*." (ProfCo-Int16) -

"*within the silos it can work quite effectively but they are quite small silos*." (ProfCo-Int18)

However, when we look at the larger organizational groupings within the firm, the structure militates against sharing - "*But we still have very much that silo mentality*." (ProfCo-Int14), and there is little tendency to share because the larger groups are so independent. "*We've basically got three lines of service and they go off and do different things and reinvent wheels*." (ProfCo-Int16)

Despite many efforts to overcome this problem, nothing seems to be very effective. "*We tend to slice things up in so many different ways - in particular our line of service groupings - people often sit in their line of service groupings as opposed to any other basis - partly they don't have any choice, but even when they are given a choice they do that. We have geographical dispersion which doesn't help. We try with other kind of things to counter some of that so we have industry groupings that cut across line of service but they never seem to be powerful enough to overcome the silo of the line of service*." (ProfCo-Int17)

In summary, the structure of the firm generally supports sharing within the smaller groupings but there is little to support it across the organization as a whole. Some interviewees feel this is not a significant problem due to the independence of the groups.

People

When we consider the people side of knowledge sharing, it is clear that the organization is attempting to embed positive knowledge sharing behaviours. "*Rather than trying to create knowledge sharing as a separate thing all the time, it's just trying to make it a more natural so people don't even realise they are doing it.*" (ProfCo-Int14) This is being pursued in a number of ways including emphasising the benefits of sharing in ordinary training courses and trying to get some connection with sharing into people's appraisals – evidence of sharing is now part of the Partner admission criteria in the UK part of the firm. Four knowledge management related questions were asked in their quarterly attitudinal survey for Q4 2006. 90% agreed with the statement 'The information I need to do my job is

easily accessible'. 92% agreed with 'The people I work for encourage me to share knowledge with others'. 81% agreed with 'I have seen evidence that initiatives to support knowledge sharing are being implemented in my group'. However only 74% agreed with 'I am recognised and rewarded for sharing knowledge'. This suggests that there may be some lack of motivation for individuals to share due to not enough recognition or reward for sharing.

Without enough motivation, it is hard to embed the required behaviours. "*I could be a bit critical of our knowledge strategy […] I don't think we've really cracked the - getting it embedded completely within the culture and rewarding people for sharing knowledge - and I think until you get to rewarding people for sharing knowledge, it doesn't just naturally happen*." (ProfCo-Int16) However it is recognised that motivation is about both recognition as well as reward and that, in many cases, the former is more important to people. "*And rewarding doesn't have to be paying money for doing it - it has to be part of the culture where people are recognised - it could be that they get their name in lights, people get to know that they're the one that knows something about some sort of stuff. I don't think paying people to do something is necessarily the way to get it embedded.*" (ProfCo-Int16)

As with many other professional services firms, a fixation with client billable time is widespread and appears to be negative in its effects on knowledge sharing. "*There is a huge focus on time and utilisation and time being spent with clients as opposed to other things and I think this is a disincentive for spending the time to sort of share. I think it is also a disincentive sometimes to spend time to perhaps do research to find out whether you can re-use things that other people have undertaken*." (ProfCo-Int17) The need to move on to the next job or project as soon as possible reduces the likelihood of recording any 'lessons learnt' or of many opportunities for learning. "*At the end of the day, they have got to get the audit done and to do an audit you do not need the add on - you need to do what you need to do. It's quite black-and-white*." (ProfCo-Int18)

In summary, both training courses and appraisals are being used to motivate individuals to share and this motivation is as much about recognition as about reward. However, pressure to deliver client work does have some negative effects

on knowledge sharing especially in that it rarely allows time to complete projects properly and learn from them.

Processes

The support for knowledge sharing within business processes varies across the firm. In some areas, processes probably support knowledge sharing more by accident than by design because they simply improve interaction between people. "*So the very fact of doing the audit and following the process - the steps – helps sharing the knowledge*." (ProfCo-Int14) However this only appears to work within teams and groups - "*I think there are other places where we do encourage sharing of things but it only works well when there's a written-down spec of - you have to do it and you have to get the tick in the box because otherwise it is not seen as a core part of someone's job to share outside of that team*." (ProfCo-Int16) When looking at the larger groupings within the company, processes have little effect. "*We have not so many processes for sharing across those groupings and the structure mitigates against it and we get people getting very territorial about things*." (ProfCo-Int17)

Overall, processes support knowledge sharing more by chance than by design and this support often works better at the local level.

Technology

The use of technology within the organization is very high. Some would say too high in terms of knowledge management. "*My biggest bugbear I have with this firm - in eight-and-a-half years I've seen eight different approaches - they've all been technology-based.*" (ProfCo-Int18)

There is also a perception that technology solutions are put in place prematurely, without adequate preparation or training and without any thought to 'seeding' discussion. "*We have a number of unstable systems. They have got better over the years but when things are first launched and there is a big fanfare and things don't work - they don't get back.*" (ProfCo-Int18)

"*The portal was a great [...] but what we found is we put this fantastic technology in place but we never trained anyone how to use it […] If they don't find something interesting when they first start using it, then I think it is unlikely that they will come back to it*" (ProfCo-Int16) These two comments emphasise the importance of users' initial perceptions. If a technology application does not deliver what they want the first few times they try it, then they are unlikely to persevere.

Sharing knowledge is made harder if it is difficult to find stored knowledge or information. In this firm there are currently multiple repositories which means that searching for something within your team or area is quite efficient, but there are few facilities for wider searching. "*A lot of our knowledge is bound up in Lotus Notes databases which work well for teams but don't work so well beyond that and we have so many of them that there is so much stuff around that finding the relevant stuff and the good stuff is hard without proper tagging and things like that*." (ProfCo-Int17)

As with most companies this size, the use of email is endemic. This appears to cause problems not only because of the volume – which means that much remains unread – but also because of the knowledge locked up in people's inboxes where it cannot easily be shared. "*But also because what then happens is that the knowledge is locked down in two or three people's inboxes or PCs instead of being more sharable*." (ProfCo-Int17)

In summary, the use of technology is not standardised across the organization and departments ('lines of service') are free to go their own ways. This results in poor facilities for sharing across the organization as a whole. The introduction of poorly thought out new services without enough user involvement is also problematic. The very high level of emails is also a source of difficulty.

These findings are summarised in Table 20.

Strategy

- At the top level of the organization, there is what is, in effect, a knowledge strategy but it is known as a 'knowledge proposition' which focuses on culture and behaviours.
- A Chief Knowledge Officer has been appointed recently.
- Knowledge of this 'proposition' seems to be limited to those at a more senior level.
- Those at a senior level extol the virtues of knowledge sharing but there seems to be some doubt as to how seriously it is really taken.
- More problematic is the level of support and enthusiasm from middle management which is much less consistent.

Structure

- The structure of the firm helps knowledge sharing at the local group level where small teams are the norm.
- Looking at the larger organizational groupings within the firm, there is little tendency to share because the larger groups are so independent.

People

- The organization is attempting to embed positive knowledge sharing behaviours in a number of ways including emphasising the benefits of sharing in ordinary training courses and trying to get some connection with sharing into people's appraisals.
- It is recognised that motivation is about both recognition as well as reward and that, in many cases, the former is more important to people.
- As with most other professional services firms, a fixation with client billable time is widespread and appears to be negative in its effects on knowledge sharing.
- The need to move on to the next job or project as soon as possible reduces the likelihood of recording many opportunities for learning.

Process

- In some areas, processes probably support knowledge sharing more by accident than by design because they simply improve interaction between people.
- This only appears to work within teams and small groups - when looking at the larger groupings within the company, processes have little effect.

Technology
• The use of technology within the organization is very high - some say too high. • There is also a perception that technology solutions are put in place prematurely, without adequate preparation or training and without any thought to 'seeding' discussion. • There are currently multiple repositories which means that searching for something within your team or area is quite efficient, but there are few facilities for wider searching. • The use of email is endemic. This appears to cause problems not only because of the volume - which means that much remains unread - but also because of the knowledge locked up in people's inboxes where it cannot easily be shared.

Table 20: ProfCo Summary

Other Areas

Attributes of Knowledge

As the interviewees were all involved in knowledge management, they were all well aware of many of the ideas behind knowledge management and of the concept of the data, information and knowledge hierarchy. However they were all of the view that this distinction was irrelevant to the users. "*The definitions wouldn't really matter to people. I think people are likely to use information and knowledge interchangeably without realising there is a difference.*" (ProfCo-Int14) One interviewee put this succinctly by saying that users just wanted 'stuff', meaning that they didn't care whether it was data, information or knowledge as long as it helped them do their job. "*They don't relate to a lot of the theoretical things around knowledge management but all they want to know - they want to know 'stuff' and in most cases if you start talking about 'stuff', it's more alive. The right 'stuff' at the right time. And I can give them examples of what sort of 'stuff' I can relate to them - talking to them about things like what is tacit or explicit knowledge - they don't want to know, they don't really care - they know what sort of 'stuff' they want, they know when they want some in depth 'stuff', they know when they want some high-level, fluffy 'stuff' to go and talk to clients about.*" (ProfCo-Int16)

There is significant effort going into initiatives to try and capture knowledge but it is less certain that people make much future use of knowledge so captured.

This is partly due to the poor search facilities in the technology - "*I think sharing kind of starts to fall down when we talk about capturing it, you know, in textual format and finding the time to do that. I think in some places re-use works – but by and large, re-use does not work so well for those kind of cultural reasons - I think the thing that possibly gets in the way of re-use is the findability as well.*" (ProfCo-Int17) – and partly due to a lack of motivation for people to re-use knowledge. There is, however, work in progress to try and improve this. "*I've been having quite an interesting discussion this last week about trying to reward people for re-use in knowledge and how do we go about doing that - the easier bit of it is probably the collecting but how do we encourage people to re-use?*" (ProfCo-Int16) One of the problems of motivation to re-use knowledge is that people are recognised and rewarded for having good ideas – "*I think there is another major cultural thing that gets in the way - it's not so much in the way of sharing but more in re-use - and that is the kind of intellectual playground thing in PwC that people feel they get promoted for the brilliance of their own ideas therefore - actually it is more an incentive for sharing because, you know, you want to tell people how wonderful you have been in thinking up ideas! And that kind of discourages somebody else from re-using it.*" (ProfCo-Int17) As this interview explains, this 'intellectual playground' feeling encourages people to innovate rather than to use other people's ideas and knowledge.

The knowledge perspective at ProfCo is also 'bridging the gap'. Knowledge in people's heads and documented knowledge are equally valued. The 'knowledge proposition' of the organization is aimed at changing culture – embedding behaviours such that knowledge sharing is done naturally – "*We have a strategy that deals with how are we going to look at the different components that make up knowledge management - it's not a traditional counting people, process, technology, blueprint that I could give out to you. The approach is much more "what are the issues that we have as a business dealing with content management, getting people to collaborate - so we have about four or five of these issues that drive the strategy*" (ProfCo-Int15).

In terms of the organization, most of the roles in the 'bridging the gap' column are in place as are the tasks being done. The same applies to KM instruments and systems where best practice initiatives are frequently starting – "*we are working with blogs and wikis at the moment and starting to look at best practice around*

them on the basis of the early adopters and things like that" (ProfCo-Int17). As well as formal knowledge collection and organization, there are tools in place to support communities and collaboration – "*I think there will be more emphasis on the whole [...] networking and collaboration going forward*" (ProfCo-Int14). As for evaluation, as well as measuring the usage of assorted databases, ProfCo surveys it's staff on a quarterly basis – "*We have a kind of indirect measurement but one which we take quite seriously which is the 'You Matter' survey - it's an attitudinal survey of all the staff and they are four knowledge management questions in there*" (ProfCo-Int17).

Overall, ProfCo falls mostly into the 'bridging the gap' category.

Measurement

There are no direct measures of the success on any knowledge management initiatives or tools but there is a quarterly attitudinal survey of the staff which normally includes four knowledge management questions. In a recent survey, the questions probed whether information was easily accessible to allow people to do their jobs; whether they were recognised, rewarded and encouraged to share knowledge and whether they saw evidence of knowledge sharing initiatives being implemented.

Overall, capturing knowledge seems to work better than actually re-using it once captured and there was a widespread view that the concepts of data – information – knowledge (beloved of academics and KM practitioners) was of no practical interest to users. Finally, an internal quarterly survey produced qualitative data on employees views of knowledge sharing.

Linkages

In this organization, the strategy – called the knowledge proposition' – was focussed on embedding behaviours - "*Yes there is [a strategy] and we express it in the form of a knowledge proposition - in summary and primary priority is to try and get the behaviours right which includes sharing as opposed to worrying so much about the technology, the structures - organizational structures or even processes. So it is very much a focus on the people side by sharing and re-using*." (ProfCo-Int17) so there is thus a good alignment between these two areas. In addition, there is a further linkage

between strategy and structure as the senior management of the team promote working across the different areas. "*We have quite defined service lines [...] I know the firm as a whole and the board focused very much on how we get everyone working together across all the lines of service more effectively. So I can see that improving as we go on, but yes, it is quite a silo mentality."* (ProfCo-Int14).

Within smaller areas of the firm, there is some linkage between processes, people and structure; "*I suppose there are quite a few knowledge intensive [processes]. But ultimately - think about doing an audit, to get a better quality audit - they have to have the knowledge and learn from each other. So the very fact of doing the audit and following the process - the steps - shares the knowledge."* (ProfCo-Int14) but there was also the view that this didn't work so well across the organization as a whole "*I think they tend to work with a structure and - I think it might be a slight cop-out - I think we have different processes at a quite substantive level in our different lines of service. I think the processes work well where it is sharing within those groupings - we have not so many processes for sharing across those groupings and the structure mitigates against it and we get people getting very territorial about things*" (ProfCo-Int17). This was reinforced by another interviewee who felt that the strategy did not bring together processes or technology across the wider organization although they commented that this was not a major problem with processes given the size of the organization. "*I would say different people do have different processes which again is - in some ways it is not helpful because I think you get an awful lot more efficiency with doing the same thing very well in different places. But in other ways, it is not as much of an issue here because we have got enough critical mass of people working in those different areas. The amount of time that they cross over so they would actually recognise that the person is different in one bit of the business to another - probably doesn't matter. I'm not sure we would have that much more efficiency other than not developing all the extra IT things. But the fact that we might have different processes in different bits of the business I think is probably all right because people work generally within their own bit of the business and as long as they work with the processes that work for them, fine. I think there is some efficiency of not having different IT bits supporting what is the same process I think - and we could save an awful lot on IT by not reinventing the wheel all the time.*" (ProfCo-Int16).

Overall, this organization has linked strategy firmly to people and their behaviours. There are also linkages to structure and to process although the latter vary across different divisions of the firm.

4.6.3 PROFCO SUMMARY

At the top level, the firm has a 'knowledge proposition' in place which focuses on embedding the behaviours necessary for effective knowledge sharing. Senior management are supportive of this in word, if not always in deed. Support at middle management levels is more variable. Sharing is emphasised in training courses and it is also beginning to be considered in individuals' appraisals. A focus on client billable time is a more negative influence.

Support of knowledge sharing by processes seems to happen mostly by chance and then only within relatively small groups. There is a great use of technology within the firm but also a view that IT systems are sometime prematurely released and are poorly designed as regards finding information.

The 'knowledge proposition' encouraged good alignment between strategy and the 'people' side of the business and also with the structure as it encouraged cross-group working. Some linkages were apparent between technology, structure and people at lower levels of the firm, but this varied from department to department.

4.7 ENGCO – AN INTERNATIONAL AEROSPACE COMPANY

EngCo is a global aerospace plc involved in all aspects of research, development and manufacturing. The company turnover is around £7Bn and they employ about 38,000 people. A search of their website and current annual report showed no relevant mentions of knowledge management, sharing or intellectual property. The company is organised into 4 major divisions and although there is a small 'central' knowledge management group (part of the corporate research and technology function), they have no authority over the divisions or individual businesses within those divisions. There is no real corporate KM executive owner although it appears to fall under the remit of the Engineering Director. Actual responsibility for knowledge management appears ill defined. This is a very process-driven organization and "*there is a statement that says 'knowledge management is the responsibility of the people who own the processes'*" (EngCo-Int19). The company has little technology to support knowledge sharing.

In 2005, the organization produced an 11 page brochure entitled 'Knowledge Management' focusing on tools and techniques of knowledge management. This also lists the 'KM Champion' for each division. However, some of those listed had never seen or heard of the brochure. The brochure was produced for an external KM conference.

EngCo returned 43 responses to the survey.

4.7.1 ENGCO INTERVIEWEES

Four members of staff were interviewed over the third quarter of 2005.

First was the leader of the central KM group (Int19). The 'leadership' role of his group is mainly due to the fact that they are more advanced in KM than anyone else. "*Most of the people who operate outside Engineering recognise that knowledge management in Engineering is leading the way … so from that perspective then we are the custodians of the knowledge management strategy*" (EngCo-Int19).

The others were three divisional 'KM Champions' as mentioned above.

The first (Int20) was the knowledge management specialist of his division. He was very focussed on knowledge retention and concentrated on trying to extract tacit knowledge from those leaving or retiring. His division has no technology aimed specifically at knowledge sharing. This was a telephone interview.

The next (Int21) was also the knowledge management specialist of his division. He had only been involved with KM for less than a year and was trying to overcome a view, spread by his predecessor, that knowledge management was all about IT.

The last (Int23) had been tasked by his division to 'do a knowledge management programme' but he found that "*they don't actually understand data management never mind information management - never mind knowledge management! They are so far behind because we have not had a lot of investment in the organization at all*" (EngCo-Int23). He was thus focussing on KM tools and toolsets.

4.7.2 ENGCO CASE DATA

Strategy

Although there is a corporate knowledge management group in this organization, the level of decentralisation is such that it has little control over the divisions, resulting in a fractured and disconnected approached to knowledge management. The divisions all have a "KM Champion" - "*At every level there is a knowledge management champion. There is a knowledge management champion at corporate level and in each of the divisions because it is one of the behaviours of [the company].*" (EngCo-Int21) - but they rarely seem to talk to each other or work together.

The KM groups in some divisions have found that even getting started can be difficult as the division is not advanced enough to even consider knowledge management – "*We started out with not a very good understanding of the organization and the state it was in. So we were talking about - we'll do a knowledge management programme and we'll do this and then we came across the basics of - they don't actually understand data management never mind information management - never mind knowledge management!*" (EngCo-Int23) So in this division they have had to

concentrate on much more basic areas before they can move on to promote knowledge sharing.

There seemed to be some disagreement as to whether a corporate knowledge strategy existed which suggests that if it does, it is not well promulgated. The leader of the KM group felt that there was, while admitting that he lacked the authority to impose it on anyone - "*The reason I said a sort of strategy, - as far as I'm concerned, we have a strategy but because we don't have a CKO or anything then I would recognise that someone else in the organization might pop up and say 'this is the knowledge management strategy for this part of the business'. So, for me, the strategy is global but I haven't got the authority to impose it across the organization*." (EngCo-Int19) whereas another interviewee felt there wasn't and that they did not need one. "*I've always said that you shouldn't really have a strategy for knowledge management, right, and what you should do is have, if you like, independent use of terminology on strategy - you should have a robust plan for managing your knowledge and your data management which is in line with the business strategy. […] So it should be part of normal business plan deployment to have, if you like, a knowledge and data management plan, if you like, rather than an overall strategy*" (EngCo-Int20) This seems to suggest the use of KM plans or processes as part of local business strategies. One interviewee said that corporately, KM is owned by the Director of Engineering whereas another, also a 'KM Champion' thought there was no senior executive with overall knowledge management responsibility, "Interviewer: There *isn't an executive with particular responsibility for knowledge management?* Interviewee: *No*." (EngCo-Int23). There was also a feeling in some areas that although knowledge management was recognised as important, top level support for it was not as good as it could be "*There is a recognition that the efficiency of the organization can go up through better knowledge management but it's not really built into the business case - it's not something that gets a lot of credence at senior level among financial people and it's not something that's talked about a great deal.*" (EngCo-Int19) However, others disagreed. "Interviewer: *So it is positively supported at board-level?* Interviewee: *Yes. [...] which is where our funding comes from - that's where we've been ring-fenced because it is recognised that we need in today's customer environment - we need to create innovative*

solutions." (EngCo-Int21) These statements suggest that senior support varies across divisions and groups.

Overall, the ownership and direction of knowledge management seemed confused. The leader of the corporate KM group commented on his inability to make people follow their advice or guidance and different divisions, each with their 'KM Champion', tend to go their own way.

Structure

As can be seen, the structure and independence of the divisions in this large organization leads to a very decentralised approach to knowledge management. "Interviewer: *Are the different divisions within [the company] very independent?* Interviewee: *Very much so, yes*. Interviewer: *So do you work closely with knowledge management in the other divisions?* Interviewee: *Not as closely as I would like to*." (EngCo-Int23) Even within the divisions, the problems of both geography and a silo mentality are considerable and do not help knowledge sharing. "*The fact that we are normally silod by geographical locations and organizationally is the thing that hinders.*" (EngCo-Int19) "*We are such a large organization and there is this tendency to put the blinkers on and just sit in your own little silo and keep your silo of information and not go beyond*" (EngCo-Int21) However, there are initiatives in place to try and bring people together from across the organization where there is value to be gained. "*We also operate something called system management teams which is something a little bit more formal than communities of practice in which - rather than it being a discussion group, people from across the company in a particular methods area will come together to form a [...] team around tools so they may use things like shared folders.*" (EngCo-Int19)

There is no perceived relationship between structure and process. "Interviewer: *Do those processes and the structure mutually enhance one another or are the organizational structure and the processes not helpful?* Interviewee: *They are entirely independent*." (EngCo-Int19)

In summary, the decentralised approach of the company did not generally support knowledge sharing across the divisions although there were some cross-divisional teams.

People

The existence of any rewards for sharing is also very variable. "*Part of the organization has knowledge sharing and knowledge management as part of their career progression criteria [...] but it's not something that operates right across the organization.*" (EngCo-Int19). Some divisions provide no recognition "*There are no overall rewards for knowledge management*." (EngCo-Int21) while others are beginning to consider knowledge sharing in individuals' appraisals. "*There is a bit in the rewards system that encourages you to share information*." (EngCo-Int23) Yet others feel they are rewarding the wrong behaviours "*In that sense the organization doesn't help because we reward people for becoming experts and we are not good at rewarding people for sharing.*" (EngCo-Int19).

'Knowledge is power' was seen as a problem in some parts of the organization - "Interviewer: *Some organizations have a problem with the business of 'knowledge is power'. Is that true here?* Interviewee: *Definitely*." (EngCo-Int23) - as were pressures of time: "*And very clearly, when you are in that very delivery focused pulse, then the chances of actually finding time to share that knowledge or that information or that bit of data with other projects and/or programmes is not the top of your agenda*." (EngCo-Int20). This statement stresses that delivery and 'getting the project out the door' have a much higher priority than any knowledge sharing activities.

Understanding of the skills needed for knowledge sharing was not felt to be widespread in individuals: "*Not really. I think even within the people that have got some sort of responsibility in line for knowledge management or knowledge sharing - I think there is not a very good understanding of the skills that they need*." (EngCo-Int19). Neither was it felt to be widely understood by the organization: "Interviewer: *Do you think people in general understand the concepts of knowledge and what skills and behaviours they need to share knowledge?* Interviewee: *Some people do. But basically the organization doesn't.*" (EngCo-Int23). It was also suggested that even pointing out

to people the behaviours required for knowledge sharing could have a negative effect – "*Some people definitely don't do it consciously and even when you have told them the behaviours you would like them to do, often they will say 'all very interesting but I have got a proper job'. And you can end up with that kind of reaction."* (EngCo-Int20). Once again, in this statement, we see the conflict between pressure to get the job done and any knowledge sharing exercises.

One interviewee also commented that new graduates arrive unprepared for knowledge sharing: "*I have the view that we actually teach people not to share knowledge in universities and at school. I can remember coming out of university and coming into [the company] for the first time for my first job and been given my first task which was a technical task and thinking that by going and getting somebody else to tell you some of the answers but that was cheating! Because you get taught that you have to solve things for yourself.*" (EngCo-Int19). This is a valid point that should be considered by graduate training programmes.

Overall, little thought is given to changing behaviours to encourage knowledge sharing across the organization as a whole. Some divisions offer some sort of recognition while others offer none. On the positive side, communities of practice seemed fairly widespread.

Processes

The company is very process-oriented and all activities are supposed to fit into one of nine primary processes – "*and there is one that covers really the ownership of all processes and within that it says - there is a statement that says 'knowledge management is the responsibility of the people who own the processes'.*" (EngCo-Int19). This statement shows that top level guidance on knowledge management is rather vague.

In addition, there is a process for capturing expertise "*We have quite a rigorous process for capturing expertise and codifying it - particular knowledge that is at risk. All that is held within one of two experts who might be retiring or something - and within that process we actually mandate that they make an effort to understand the business case in terms of pounds but that's never reflected in the bottom line - something for the project themselves to understand why they're doing it and what benefit they are going to get.*"

(EngCo-Int19). However this does appear to be a rigid and long drawn out procedure. "*Basically, it takes three months to interview, to record, to go away and formulate the questions, come back - it takes a long while to actually do it*." (EngCo-Int23). Another concerns the administration of the 'capability intranet'. "*The capability intranet is an intranet but it's an engineering intranet and the structure of it maps onto the business process model. It has a fairly formal ownership framework and there is a process which defines how you create, sign off, modify, edit the content that goes on to that system*." (EngCo-Int19) and a third covers 'lessons learnt'. "*On things like lessons learned, the procedures mandate in certain places to go looking for information and certain procedures mandate that you have to go and look at those various bits of codified information*" (EngCo-Int19). These processes seemed to be understood by the other interviewees although there was a comment that they were very high level processes. "*Lessons learnt, for instance. There is a defined process. The capability intranet - there is a defined process for setting up a website. So yes, there are processes which are in place. But they tend to be at the higher level*." (EngCo-Int21).

In summary, this is a very process-driven organization and some of the processes do encourage knowledge sharing. The focus tends to be on tools and techniques.

Technology

There is an understanding that technology is part of knowledge management, but not all of it. "*I've been trying to explode certain myths and one of the myth is that knowledge management does not equal IT. IT helps, but it is only there to get the information - it doesn't actually generate knowledge."* (EngCo-Int21) Overall, the use of technology is variable and disjointed. The corporate group is very proud of their 'lessons learnt' database, but another division comments that it is virtually impossible to search it so they find it useless. "*When I speak to people about it they say 'well I didn't find the information I wanted last time I looked' and unfortunately therefore it has fallen into disrepair, disregarded because of expectation management."* (EngCo-Int21) This offers another indication that users will not persist with utilising systems which do not deliver what they want.

The ‘Capability Intranet’ is widely available, but there is a significant bottleneck in that only one person in the organization can add information to it. As a result smaller, localised (and unconnected) solutions are appearing. One division is proud of its ‘knowledge database’ which is simply a file storage space on the local area network which is searchable only by file name. Another division wanted better search facilities so went and developed its own. “Interviewee: *And obviously there is the corporate search activity that allegedly is going on. […]We haven't got time for that so we have actually developed our own.”* (EngCo-Int20) These findings all suggest that the lack of any centralised control of technology is detrimental to knowledge sharing. Some of this was blamed on the low level of IT technical expertise available – and this in turn was blamed on outsourcing. “*Most of the IT organization within [division], they are people who can fill an Excel spreadsheet in […] that's the level of expertise they've got in terms of IT.”* (EngCo-Int23)

There is also a company-wide document management system available but it is badly implemented “*Unfortunately, we cocked up the implementation rather badly […] So we got the balance completely wrong and the business itself - this is one of the lessons we've learned from that implementation - the business itself didn't understand basic document management*.” (EngCo-Int23)

There are many communities of practice “*We have communities of practice which have discussion forums that are basically enabled by Outlook shared folders and Outlook web access*.” (EngCo-Int19) which again operate with varying degrees of success. “*We've also […] something like 85 communities of practice which in itself - and is increasing because people see the value of communities of practice - but communities of practice […] are best when they are organic and they are not formalised and they are not constrained by an unnecessary structure and when all participants are willingly contributing. Therefore they have a natural product life and when they die they should be allowed to die out - they shouldn't be re invented.*” (EngCo-Int21) So communities of practice are in widespread use but they appear (and disappear) at a local level so there is no system or process for capturing, storing or spreading the knowledge across a wider community.

Overall, available technology varies widely across the organization and the lack of any corporate KM standards result in many disconnected repositories.

These findings are summarised in Table 21.

Strategy

- Despite a corporate knowledge management group, there is a fractured and disconnected approached to knowledge management.
- Divisional 'KM Champions' rarely seem to talk to each other or work together.
- There seemed to be some disagreement as to whether a corporate knowledge strategy existed which suggests that if it does, it is not well promulgated.
- Ownership of KM was also confused - one interviewee said that KM is owned by the Director of Engineering whereas another thought there was no senior executive with overall KM responsibility.
- There was some feeling that although KM was recognised as important, top level support for it was not as good as it could be.

Structure

- The structure and independence of the divisions leads to a very decentralised approach to knowledge management.
- Even within the divisions, the problems of both geography and a silo mentality are considerable and do not help knowledge sharing.
- There are initiatives in place to try and bring people together from across the organization where there is value to be gained.

People

- The existence of any rewards for sharing is very variable. Some divisions provide no recognition while others are beginning to consider knowledge sharing in individuals' appraisals.
- 'Knowledge is power' was seen as problem in some parts of the organization.
- Pressure of time was seen as a deterrent to knowledge sharing.
- Understanding of the skills needed for knowledge sharing was neither felt to be widespread in individuals nor widely understood by the organization.
- It was also suggested that even pointing out to people the behaviours required for knowledge sharing could have a negative effect.
- There is considerable use made of 'Communities of Practice' at a local level.

Process

- The company is very process-oriented and all activities are supposed to fit into one of nine primary processes.
- There are other processes for capturing expertise, administering the 'capability intranet' and for 'lessons learnt'. However these appeared to be very rigid and long drawn out procedures.

Technology
• The use of technology is variable and disjointed. • The corporate group is very proud of their 'lessons learnt' database, but another division comments that it is virtually impossible to search it so they find it useless. • The 'Capability Intranet' is widely available, but there is a significant bottleneck in that only one person in the organization can add information to it. • As a result smaller, localised (and unconnected) solutions are appearing. • There was also a worry expressed about the low level of IT technical expertise available - this was blamed on outsourcing.

Table 21: EngCo Summary

Other Areas

Attributes of Knowledge

Outside of the KM group, concepts of data-information-knowledge are avoided as is the term 'knowledge management' as it is felt that it just tends to confuse people. "*We do use those terms but we try not to use those terms with the people we are trying to do it with because really it is semantics.* […]*We don't explicitly talk in those terms. Because I think it confuses everybody. We tend often to not use the phrase knowledge management because that confuses everybody as well.*" (EngCo-Int20) Any new initiative tends to be perceived as another management 'buzz word'. "*We get initiative overload. Give it an initiative title and it's a case of 'not another one from on top - we'll give it a go - if it doesn't work, that's it, we'll bin it'.*" (EngCo-Int21) As such, there is pressure to try and ensure that knowledge management is **not** seen as an 'initiative'.

Within EngCo there are both technology- and human-oriented knowledge perspectives. Repositories exist (albeit in a disjointed fashion) and communities of practice are fairly widespread – "*We've also got community of practice forums and something like 85 communities of practice*" (EngCo-Int21). The organization is thus moving towards a 'bridging the gap' approach. No knowledge strategy as such exists but the KM group's approach is mostly to do with documentation, knowledge retention and database – "*We are putting in a knowledge database which*

is quite simply a storage space on the LAN - as opposed to the 28 different ones we have got at the moment!" (EngCo-Int23).

The culture of the organization is largely technocratic – probably due to the very great preponderance of engineers and scientists – but communities are being fostered and knowledge sharing events organised so they are moving towards a wider approach.

In terms of instruments and systems, there is still – as discussed above – a focus on databases and document management – "*We have Documentum - used to be the best document management system on the planet. Unfortunately, we cocked up the implementation rather badly!*" (EngCo-Int23). However, processes are in place to try and capture expertise – "*we have quite a rigorous process for capturing expertise and codifying it - particular knowledge that is at risk all that is held within one of two experts who might be retiring or something*" (EngCo-Int19) - and learn from mistakes "*What we have got is the lessons learnt log and one of the things ... at the moment it's just an Access database and one of the drawbacks is the number of logs which you can pull down on the menu and you feed your lessons learnt into*" (EngCo-Int21).

There was little sign of serious attempts at evaluation – "*it's qualitative, gut feel*" (EngCo-Int19) although one reference was made to a part of the company using a balanced scorecard approach – "*Certain parts of the company have got some kind of measurements - one part of the business is using balanced scorecard and knowledge sharing is part of that*" (EngCo-Int19).

Measurement

The approach to the measurement of the success of knowledge sharing varies across the organization, "*Certain parts of the company have got some kind of measurements - one part of the business is using balanced scorecard and knowledge sharing is part of that*." (EngCo-Int19) but is generally uncommon and, where it does happen, is largely qualitative - "*It's qualitative, gut feel*." (EngCo-Int19) "*It is a qualitative thing whereby you just see how far up the maturity curve you believe you really*

are" (EngCo-Int20). From the quantitative point of view, there are statistics collected on both the use of communities of practice "*We monitor statistics on things like communities of practice in terms of, you know, how many people are there, how many people are posting, all that sort of stuff.*" (EngCo-Int20) and on the use of lessons learnt "*So one of the things they are using the lessons learned log is to see the number of hits*" (EngCo-Int21). These two quotes show that they are measuring the usage level of some technology tools however, they are not really making any effort to associate the results with any perceived benefits.

There does seem to be a feeling in most areas that intangible benefits are acceptable. "*I am not looking for tangible benefit. If we are talking about efficiency savings, I am not going to come back in two years' time and say "did you carry out this number of design […] using this tool? Did you actually have this reduction each time you used it?" that would be a nonsense. So what I am saying is that I'm looking for credible benefits - and looking for - if people can turn to me and say "it is reasonable to assume that in a normal year there will be this number of engines, this number of projects, this number of meetings, this number of design iterations and this tool will actually save, on each of those occasions, a certain amount of time*" (EngCo-Int21).

Overall, the concepts of data – information – knowledge are well understood by those involved with KM, but they are considered unhelpful to users, as is the use of the term 'knowledge management'. Attempts at measuring the success of knowledge sharing include counting database accesses and some simple qualitative approaches.

Linkages

As there is no top level KM or KS strategy, there is little linkage between strategy and structure, "*Someone else in the organization might pop up and say 'this is the knowledge management strategy for this part of the business'."* (EngCo-Int19) but at least there is an appointed 'KM Champion' for each division – "*At every level there is a knowledge management champion. There is a knowledge management champion at corporate level and in each of the divisions because it is one of the behaviours of [the*

organization]." (EngCo-Int21) where knowledge sharing appears to be guided largely by the organization's business processes. "*There is a statement that says 'knowledge management is the responsibility of the people who own the processes"*'. (EngCo-Int19).

There are some positive linkages between people, process and technology in that there is a 'lessons learnt log' – "*We also have a formal procedure which describes how we handle lessons learnt. So we have a system called lessons learnt log [...] any Tom, Dick, or Harry can go and enter a lesson [...] and the process describes how those lessons should be sentenced, how we should be actioned and how they should be archived and closed out. So it's a formal closed loop learning system so that the lessons get embedded in the process.*" (EngCo-Int19). However, motivation appears lacking and the system is not always used as it should be – "*In some parts of the organization I'd say it is in the culture and that's where it's working very well, but again, we recognise there are other parts of the organization who are either not following the processes quickly - and that tends to be the problem, not that they don't follow the process but because they don't follow it as quickly as they should. Or they, for some reason, are not actually putting the lessons in - so there is - the cultural aspects about putting the log in place are not enough - there has to be a way of encouraging people to put the lessons in*" (EngCo-Int19). "*There are certain projects who are doing them almost on a weekly basis. There are others who may have heard of them, but are not quite sure*" (EngCo-Int21). Another linkage in this area is provided by the 'capability intranet' which tries to make skills known across the whole organization – "*The first element of knowledge management within [the organization] was back in 1996/97 when they created the capability intranet - when they basically got together common knowledge so that people could readily access it and then they realised that people were spending less and less time having to go and trawl for things."* (EngCo-Int21). However some areas of the company do not find this very useful due to access problems – "*The problem we have - intranets - great idea, lovely - I'd got an intranet, it's on a web server which half a per cent of the population have got write access to, so sharing knowledge is not possible. […] It takes us so much time to get things on to the intranet that, as a technology, it's a waste of time. We don't bother.*" (EngCo-Int23). There are also system management teams that operate across divisions – "*We also operate something called system management teams which is*

something a little bit more formal than communities of practice in which - rather than it being a discussion group, people from across the company in a particular methods area will come together to form a […] team around tools" (EngCo-Int19).

In summary, although this organization has no top level strategy for knowledge sharing, it is a company that is very process-driven. At the local level, there seems to be some linkage between these processes and knowledge sharing initiatives although the lack of any top-level support reduces their effectiveness.

4.7.3 ENGCO SUMMARY

Although there was a feeling that the importance of knowledge sharing was recognised at the top level, there was little concrete support and no overall strategy. A corporate KM group exists but has no power to enforce anything and neither has it any power over the divisional 'KM champions' who in turn, have no power in their divisions.

Communities of practice are fairly widespread but recognition or reward for sharing varies across the organization from nonexistent to almost negligible. A 'knowledge is power' attitude prevails in many areas and pressures on time also detract from sharing.

The company is very process-oriented and although some purport to be aimed at aspects of knowledge sharing, in reality, most are more about collecting data or information. The use of technology is very variable and disjointed but most is focussed on data and information sharing and search facilities were felt to be poor. The lack of corporate guidance led to many small, localised, disconnected solutions.

These results are compared and contrasted with the survey results in 6.2.

There was no alignment across the whole firm due to the lack of any corporate drivers. However there was some lower level alignment between processes and knowledge sharing initiatives.

4.8 SUMMARY

The within-case analyses in this section have provided a view of knowledge sharing within each organization. How that knowledge sharing is related to strategy, structure, people, process and technology has been analysed along with any linkages (or lack thereof) between the different areas of the model. Significant variability between the organizations has been found and this will be discussed later.

The findings for each company are summarised in Table 22.

TelCo	• Although there is a widespread internal view that this is a knowledge intensive company, there is no strategy and no sign of executive responsibility for knowledge sharing. • There is little to motivate people to share and the considerable technology focuses on data and information sharing. • There is little sign of any alignment.
LawCo	• Despite accepting that knowledge is fundamental to the way this firm works, there is no strategy or senior responsibility for knowledge sharing. • A very strong fixation with booking time to clients militates against sharing knowledge. • Technology is again focussed on the provision of data and information and there are no significant areas of alignment.
PubCo	• This organization is very focussed on managing information and data. • There is no strategy for knowledge sharing and little to motivate people to share. • A team attempts to learn from practice but there is nothing to encourage anyone to utilise any lessons learnt. • There is very little alignment.
ProfCo	• This firm considers itself a knowledge intensive company and has a top-level strategy in place to try and embed behaviours that support knowledge sharing. • This approach shows signs of success but is somewhat countered by the focus on client billable time. • Some processes help knowledge sharing as does some of the technology. • Efforts at alignment are apparent.

EngCo	• This organization also thinks it is a knowledge intensive company but has no strategy in place and a debatable level of senior support. • The extreme independence of divisions within the company results in a widely varying level of knowledge sharing support and approaches. • There is little to motivate sharing and technology support is generally poor. • There is no sign of alignment at the corporate level.

Table 22: Within-Case Summary

This chapter has described the approach to coding and analysis and then presented the data for each organization in turn, first describing the organization and the interviewees and then considering the interview responses as related to strategy, structure, people, process and technology. After summarising those findings, other areas of interest arising from the interviews are discussed followed by an analysis of any alignment or linkages. Finally, the findings for each company are summarised.

The next chapter will move on to cross-case analysis.

5 CROSS-CASE ANALYSIS

This chapter will analyse data across all of the cases in order to identify similarities and differences in knowledge sharing across the organizations. By identifying these similarities and differences, further insight into issues around knowledge sharing may be gained by generalising the case study results. In Chapter 2, a theoretical framework was proposed which has been used to help make sense of the within-case data (as discussed in Chapter 4). This same framework will be used as a template for comparing and generalizing the empirical results of the five cases. Studying multiple cases makes it possible to build a logical chain of evidence (Miles & Huberman, 1994; Yin, 1994). In other words, this section will use the cross-case analysis to seek a chain of evidence for the relationships studied on the basis of the framework.

This chapter will thus first look at the data for each organization across each area of the framework. It will then consider the linkages found for each company and any common findings from other areas that were raised in Chapter 4. Finally, it will look at commonalities across all the cases.

5.1 CROSS-CASE COMPARISON

The cross-case data is first summarised in Table 23, Table 24 and Table 25.

	TelCo	LawCo	PubCo	ProfCo	EngCo
Strategy	No KS strategy and no board level responsibility for KS. Middle management do not take KS seriously.	No KS strategy and no partner level responsibility for KS despite saying knowledge is fundamental to the organization.	No KS strategy. The CEO claimed an Information Strategy existed but other directors were unconvinced.	A top-level knowledge 'proposition' focuses on embedding the necessary behaviours and culture for KS. Despite having a CKO, there are doubts about the sincerity of some senior management support and at a lower level, support is less consistent.	A fractured and disconnected approach to KS with no obvious strategy or ownership and little serious top level support. Divisional 'KM Champions' appointed, but rarely work together.
Structure	Structure does not help KS but there was a feeling that it had little effect on KS at the individual level.	Sharing within departments is quite good although even there, chance plays its part. The 'silo mentality' was mentioned although there was an awareness of the problem.	Conditions for KS exist within small teams but the larger structure was considered detrimental to sharing. This was considered an inevitability of large organizations. Knowledge Fairs had been held to try and mitigate the problem.	Small teams are the norm in this firm which helps KS. There is little sharing, however, across the larger groupings in the company.	The divisions of the company are very independent and even within the divisions a silo mentality is sometimes evident.

	TelCo	LawCo	PubCo	ProfCo	EngCo
People	There are few incentives to share knowledge and the required skills or behaviours have not been considered. A 'knowledge is power' attitude is prevalent which does not help KS.	A fixation with booking time to clients outweighs the little motivation to share. This is recognised, but no solutions have appeared yet. There is little incentive to record 'knowledge' to use it again.	It was felt that people were not against sharing, but there was nothing to motivate them to do so. Recognition was felt to be more useful than reward. KS was not high in people's priorities. A cross-divisional team collected *lessons learnt*, but they were rarely re-used.	The firm is trying to embed positive behaviours through training and through appraisals and it is recognised the motivation is about recognition as well as reward. A focus on billing time to clients impacts negatively on KS and the need to move on from project to project as soon as possible reduces opportunities for learning.	'Knowledge is power' was seen as a problem in some areas and rewards or recognition for sharing varied widely across the organization. The need for KS skills was not widely understood and there was concern that 'KM' was seen as another management fad. Pressures on time were seen as detrimental to KS although there was considerable use of 'Communities of Practice' at a local level.
Process	There are many business processes but none specific to KS. Some may help KS by chance.	This firm is not very process-driven. Some low-level processes may help KS by chance.	Processes exist for promulgating information but there were doubts as to whether they were followed. There is a view that these probably at least help KS.	Within smaller groups, some processes help KS but by chance rather than by design. Higher level processes have little effect.	The organization is very process-oriented and there are some processes relevant to KS. However these appeared to be rigid and time-consuming.

	TelCo	LawCo	PubCo	ProfCo	EngCo
Technology	This is a very technology-capable firm where almost everything is delivered by intranet. However there were doubts about whether it helped collaboration and about its search facilities. Users were rarely involved in system design.	The technology focuses on providing repositories of information. New systems have been poorly launched. System design is driven by the IT group, mainly due to lack of interest on the part of the lawyers. (Many senior lawyers do not use information systems to any great extent.)	Technology is aimed solely at data and information provision.	There is a high level of technology usage – some feel too high. Technology solutions are sometimes put in place with inadequate training or user preparation. There are so many repositories that finding things outside of one's immediate grouping is hard. Too much information is hidden in users email inboxes.	The provision and use of technology varies widely. One group will think highly of an application or a database while another will dismiss it completely. Despite (or perhaps because of) a lack of IT expertise, a plethora of small, unconnected solutions were appearing.

Table 23: Cross-Case Data and the research framework

	TelCo	LawCo	PubCo	ProfCo	EngCo
Linkages	The lack of any strategy implies that there will be no strategic drivers towards alignment. There were some lower level linkages between people, process and technology. Structure appeared independent of any linkages however one interviewee felt structure was irrelevant to KS anyway.	Once again, the lack of any strategy implies that there will be no strategic drivers towards alignment. KM is driven from a middle-management level and thus has not the power and status necessary to progress. There are no significant signs of alignment.	Yet again, the lack of any strategy implies that there will be no strategic drivers towards alignment. The use of 'Share Fairs' offers some linkage between structure and people and the 'Lessons Learnt' team links structure and process – but then fails to involve people.	Strategy – called internally the 'knowledge proposition' – is linked to people and their behaviours. Team working links strategy and structure and within smaller areas of the firm there was evidence of some linkage between processes, people and structure.	Yet again, the lack of any strategy implies that there will be no strategic drivers towards alignment. The company is very process-driven and there is some evidence that some process link people and technology at a low level; however this is not widespread across the company.

Table 24: Cross-Case - Linkages

	TelCo	LawCo	PubCo	ProfCo	EngCo
Attributes of Knowledge	Those involved with KM understood the concepts of data, information and knowledge and considered that 'knowledge' required people. Most normal users had not considered the distinction and did not find it particularly useful. Heavily technology-oriented knowledge perspective.	Again, those involved with KM understood the concepts of data, information and knowledge and considered that 'knowledge' – which tends to be referred to as 'know how' - required people. Although not using the terminology, the importance of tacit knowledge to the firm was recognised. Generally 'bridging the gap' knowledge perspective.	Although not directly involved with KM, two of the interviewees understood the concepts of data, information and knowledge and considered that 'knowledge' required people. One used the term 'intelligence' largely synonymously with 'knowledge'. Technology oriented knowledge perspective.	Those involved with KM understood the concepts of data, information and knowledge but felt that it was irrelevant to users who just wanted 'stuff' and did not care what it was called. Much effort goes into capturing knowledge, but less into making anyone use the knowledge so captured. 'Bridging the gap' knowledge perspective.	Outside of the KM group, there are efforts to avoid the term 'knowledge management' as it is perceived as a buzzword. The initiatives that collect knowledge are not matched by any to persuade people to use that knowledge. Moving towards 'bridging the gap' knowledge perspective.
Measurement	Many things are measured, but none relate directly to KS. Improvements have been linked to enhanced access to information.	The usage of databases is measured, but not much use is made of the data collected. There are no measurements relating to the success of KS.	There were no efforts to evaluate the benefits of KS and it was clear that measurement was not something that had even been considered.	There are no direct measures of success for KS but a quarterly attitudinal survey provides some level of general qualitative feedback.	Measurement of the success of KS varies across the organization but is generally vague and qualitative or involves measuring database usage. The concept of intangible benefits seems acceptable so it is not pursued very seriously.

Table 25: Cross-Case - Other Data

5.2 CROSS-CASE COMMONALITIES

The following sections will consider possible commonalities found from looking at the data across all the companies.

5.2.1 STRATEGY

Four of the organizations involved had no top-level strategy for knowledge management or sharing although one organization mentioned that *facilitating better collaboration* was part of the corporate vision. The fifth had a 'knowledge proposition' which impacted strongly on behaviours and was a knowledge strategy in all but name. Nearly all felt that there was a general understanding of the need for collaboration although only one (ProfCo) felt that it actually affected their strategy in practice in that there was a focus on changing behaviours to try and embed those that helped knowledge sharing. This organization was also the only one to have proactive board level support for knowledge sharing.

The same four organizations had no board level members specifically focussed on knowledge management or sharing and there were a number of comments about the lack of serious interest at the highest levels. "*There are pious statements that come down from on high*" (TelCo-Int1) "*I would certainly question whether there is a real commitment*" (ProfCo-Int18).

There was also a view that senior management did not really understand the benefits of knowledge management and knowledge sharing but just felt it was a 'good thing'. "*They would make statements that they could see business benefits from it, but what those business benefits were in pound notes they would dearly like to know*." (TelCo-Int1) "Interviewer: *So there is a perception, at least at a senior level, that the knowledge is important.* Interviewee: *There is a perception! That's possibly as deep as it goes!*" (PubCo-Int11).

There were few comments about the business benefits of knowledge and they were centred around increasing efficiency "*what the people know and what they can deliver is what is going to bring us more business*" (ProfCo-Int16) and 'not reinventing wheels'. "*A quality product, reduced rework, not making the same mistakes*" (EngCo-Int19).

5.2.2 STRUCTURE

Views on organizational structure were consistent across virtually all organizations and interviewees. All thought that while knowledge sharing generally works in small groups, teams or departments, it does not work well across the organization as a whole. There were many mentions of 'silos' and 'silo mentality'.

Reasons given included observations that departments create barriers and people are territorial and do not mix out of their groups; geographical problems – the physical distancing of disparate groups and the lack of processes to help cross group sharing. Despite these, there was also a view that structural problems had little effect on people's desire to share.

A number of interviewees and organizations had obviously thought quite deeply about these problems but had found no obvious solution regardless of the structural approach taken. "*You can cut organizations in a number of different directions, whichever way you cut it, you have to have some divisional or separate responsibilities, separate lines of reporting, separate lines not just of personal reporting but of project reporting and at some point they come together. But, […] which ever way you cut it, you will have difficulty communicating in the other directions.*" (PubCo-Int10) They did not appear to have considered whether different structures might be better than others. Even those organizations that have tried various solutions have found it hard trying to make knowledge break out of the silos. "*We try with other kinds of things to counter some of that so we have industry groupings that cut across line of service but they never seem to be powerful enough to overcome the silo of the line of service.*" (ProfCo-Int17)

5.2.3 PEOPLE

All the organizations involved felt that there was little to motivate people to share knowledge although sharing within small groups does take place primarily because it is of mutual benefit to the participants. Indeed, in some instances, the 'knowledge is power' culture specifically motivated people not to share. People tend to be rewarded for their expertise rather than for sharing. "*The organization doesn't help because we reward people for becoming experts and we are not good at*

rewarding people for sharing." (EngCo-Int19) Apart from this lack of reward or recognition, major drivers for this lack of motivation appeared to be lack of time and lack of measurement. If people are not measured for their knowledge sharing performance, then it will be low on their priorities and pressures on their time mean it rarely happens. In some areas of some organizations a consideration of knowledge or information sharing abilities is beginning to appear in performance appraisals however it is usually a soft measure of subsidiary importance. "*There is a bit in [our] rewards system that encourages you to share information.*" (EngCo-Int23)

In terms of **what** motivates people, it was felt that recognition and peer acclaim were greater drivers than financial reward systems and that whatever motivation was used, it needed to be embedded in the processes and behaviours of the organization so that it happened automatically.

In one organization, the view was expressed that making access to knowledge and information too easy could also have a negative effect. "*If we make things too easy for the juniors, they cease to strive - they cease to try - they cease to go out and seek. They expect everything to be delivered to them on a plate.*" (LawCo-Int6) The implication here is that if these users can find everything they want very easily, then they will just take it at face value and not bother to explore further. If the repositories that they use are managed, complete and up to date, then this need not be a problem; however it could reduce the breadth of user research.

When talking about the effects of culture, it is perhaps not surprising that there is more of a diversity of comments. However two areas attracted a number of observations.

The first is that the idea that 'knowledge is power' is alive and well. "*Why should I impart this knowledge which gives me the ability to do my job better than Fred down there. If I give that information to Fred, he might be able to do my job better than I do.*" (TelCo-Int3) In part, this is related to the tendency of many organizations to value people who seem to know most. "*People perceive their value by how much they know.*" (ProfCo-Int15).

The second was pressures on time. The focus on 'getting the job done' is such that knowledge sharing activities tend to come a poor second. "*So I put together a three hour course which is still quite short for getting to grips with Excel. And the guy said 'if I come on a three hour Excel course, I'm going to have to work till 9 o'clock tonight'. And that encapsulates it - it's just so frustrating because that is so short term."* (LawCo-Int8)

"*I definitely feel that there is a willingness and motivation to share knowledge - definitely. [Long pause] but the workloads of the day and being measured against progress, as it were - then one is really up against it and one tends to really focus on what one has to do and what the individual has to do, rather than seek to share something with somebody else*." (PubCo-Int10). This particularly effects areas like project wrap-up meetings and as a result, there is a tendency for lessons not to be learnt or disseminated as staff are rapidly moved on to the next project.

With the exception of one organization, (ProfCo) the skills and behaviours necessary to enhance knowledge sharing were not well understood – in fact they were rarely thought about at all. Whether or not individuals were positive about sharing was very variable. Some shared happily while others were wedded to 'knowledge is power' "*to a lot of people, knowledge is power and all that kind of stuff*" (TelCo-Int1). The need for these skills and behaviours was rarely considered at the organizational level either and so the concepts were not explained to them and there was little to motivate them. "*I don't think at the moment it is on their [HR] agenda"* (TelCo-Int3) Interviewer: "*D'you think people in general understand the concepts of knowledge and what skills and behaviours they need to share knowledge?*" Interviewee: '*Some people do. But basically the organization doesn't*." (EngCo-Int23)

The one organization that was different, (ProfCo), was working both through training and through HR to try and embed the required behaviours, but even here there were perceived problems. "*I think in the main, they know what they should be doing and they even feel guilty sometimes about not doing it and that tends to be countered by 'well, I haven't got the time anyway' or 'I'm being asked to do something else'*" (ProfCo-Int17).

5.2.4 PROCESS

None of the organizations utilised high level business processes focussed specifically on knowledge sharing although some include 'motherhood' statements about it. "*There is a statement that says 'knowledge management is the responsibility of the people who own the processes.' "* (EngCo-Int19) However most interviewees felt that processes often helped knowledge sharing even if only by chance because many involve workflow or interaction that causes information or knowledge to be shared around. "*A process by its very nature goes through a chain [...] and as it goes through the chain, knowledge is shared.*" (PubCo-Int10)

Some organizations had low-level processes aimed at a specific knowledge sharing need. "*We also have a formal procedure which describes how we handle lessons learnt.*" (PubCo-Int10) However there is no evidence that these enhance overall knowledge sharing in the organization outside of their very specific focus.

5.2.5 TECHNOLOGY

Two main points emerged from discussions about the use of technology. The first is that any new technology must be properly designed and launched. It must meet the needs of the users, *"… this is something that I think we've learned a real lesson on, is that if you don't listen to the people, they won't use it*." (TelCo-Int1), and make their life easier while not unduly constraining their way of working. "… *the second that it comes up with barriers and says 'No, stop, you can't make the next step until you've done a conflicts check with so and so' it's going to be a problem*." (LawCo-Int5) It needs to be sold to the users, "*They put a lot of work into developing this thing and basically, a note went out on Friday saying your new intranet will be live on Monday - go and have a look if you want. And that was it*." (LawCo-Int8), it needs to work, and training has to be provided. Poor launches often mean the technology will not be given a second chance, especially if it did not do what the user wanted first time.

The second point is the provision of first class search facilities, "*It's impossible to find - I often find it's impossible to find things. Even when you know something is there - you can't find it. God help me if I didn't even know it was there and was trying to find it.*" (LawCo-Int9) , along with tagging and indexing. "*Finding the relevant stuff and the good stuff is hard without proper tagging and things like that*." (ProfCo-Int17) Without

an easy means of finding what the user wants, all of these repositories – regardless of whether they are of information or knowledge - are of little use.

5.2.6 LINKAGES

The lack of any corporate strategy for knowledge management or knowledge sharing militates against any organised, widespread linkage or alignment between the different aspects supporting knowledge sharing. "*Because we don't have that overarching strategy in place and we don't have policies or anything else.*" (TelCo-Int3). This is especially the case if coupled with an absence of significant top level support. "*Our most important move is to put in place knowledge management partners because at the moment the PSLs are very aware of issues but they don't have the status to get them on to the departmental partners agenda.*" (LawCo-Int6).

When a strategy is not present, processes sometimes seem to drive alignment in two particular areas. First, technology is often provided to assist and support a process which can result in both the technology and the process supporting knowledge sharing. "*For example, one of the business processes we are putting in place first is automated file opening.*" (LawCo-Int6). Similarly, a process can encourage people to share simply by ritualising some sort of communication. "*So it's a formal closed loop learning system so that the lessons get embedded in the process*." (EngCo-Int19).

The one organization researched with a centrally driven strategy in place (ProfCo) had more areas of alignment in place and focused on getting behaviours to align with strategy. "*Primary priority is to try and get the behaviours right which includes sharing as opposed to worrying so much about the technology, the structures - organizational structures or even processes. So it is very much a focus on the people side by sharing and re-using*" (ProfCo-Int17). Despite the comment here that the focus was on behaviours rather than technology, structure or process, alignment across all these areas was more noticeable with this company as can be seen in the within-case analysis.

It seems possible that a basic level of knowledge sharing competence is required (for example, top level management buy-in and some sort of strategy) before alignment can become relevant.

5.2.7 ATTRIBUTES OF KNOWLEDGE

Interviewees were asked about the difference between data, information and knowledge and this resulted in a number of definitions of knowledge:

"*The knowledge for me, is like gaining access to the relevant information at the right time*." (TelCo-Int1)

"*The most valuable information is still between people's ears then that's a way of tapping into it and for me I think it turns it from a 2-D piece of information into a 3-D piece of knowledge*." (LawCo-Int6)

"*But, much wider than that, is what I suppose you could call knowledge - the experience, the use of that data in particular situations."* (LawCo-Int7)

"*Knowledge is more akin to the understanding of the implications of information*." (PubCo-Int10)

All of these have similarities to the many definitions of knowledge discussed in the literature review.

The majority of the interviewees felt that knowledge required people. "*It is value added information and that per se, requires somebody - probably with knowledge - to actually add something to that information.*" (PubCo-Int11) "*It's very person-centric*." (EngCo-Int20) Despite this, they also all talked about their technology systems as 'storing knowledge'. This seems to be related to another point made by nearly all the interviewees which is that the average knowledge worker has no interest whatsoever in the distinctions between data, information and knowledge. As one interviewee put it, they want 'stuff' – "*The right stuff at the right time. […] they know what sort of stuff they want, they know when they want some in depth stuff, they know when they want some high-level, fluffy stuff*." (ProfCo-Int16)

A number of questions explored whether organizations put as much effort into disseminating collected knowledge as went into collecting it in the first place.

Some interviewees equated document storage with 'Collecting knowledge' and felt that people only did this if they were told to or if it was automated. "*Where it falls down, is that a very few people actually think, having done something, Ah - that would be of use to other people. They tend to think that was a unique situation particular to that client - great to have resolved it, but it's never going to be of any use again to anybody and therefore never get stored anywhere*." (LawCo-Int7) "*When somebody thinks about something, they think about how they are going to use it. The last thing on their mind usually is how somebody else is going to use it*" (EngCo-Int20)

Other organizations had active processes to collect 'lessons learnt' or to collect knowledge from individuals who were leaving and to store this in some fashion. However few organizations actually utilised the knowledge so collected. "Interviewer: *So if you are project manager on a new project, is there anything to make you go and look at previous lessons …* Interviewee: *Does somebody stand over you and force you to read something? - No! Is it considered best practice that you ought to do that? - yes*. Interviewer: *Does it happen?* Interviewee: *No!* [laughter]" (PubCo-Int10)

There was little encouragement or incentive to re-use knowledge. "*What we find is that people don't go and get involved in that data. They would much rather go and get involved with doing the job and learning by experience - or talking to the last guy who did it - than actually reading all the knowledge that we have extracted.*" (EngCo-Int23)

Overall, far more effort was expended on collecting knowledge than on persuading people to re-use it.

The knowledge perspective of each organization was discussed in Chapter 4 and the results are summarised in Table 26.

Company	Approach	Strategy	Organization	KM instruments & systems	Economics
T = Primarily Technological Orientation; B = 'Bridging the Gap' (In no case was there a primarily human-oriented approach.)					
TelCo	T	T ⇨ B	T	T ⇨ B	T
LawCo	B	B	B	B	T
ProfCo	B	B	B	B	T ⇨ B
PubCo	T	T	T	T ⇨ B	-
EngCo	⇨ B	T	T ⇨ B	T ⇨ B	-

Table 26: Knowledge Perspectives

It can be seen that only ProfCo and LawCo are actively bridging the gap. PubCo is very technology-oriented followed by TelCo and EngCo both of which are moving towards bridging the gap in some areas. The ramifications of this table are discussed later in section 7.1.7.

5.2.8 MEASUREMENT

No attempt is made at quantitative evaluation of the benefits of knowledge sharing by any of the organizations. Comments made about evaluation and measurement used such words as 'informal', 'gut feel', 'qualitative' 'anecdotal', and "*Well, the company is growing at 40 per cent and we don't produce anything so it has to be down to our sharing"* (ProfCo-Int18).

Where communities of practice existed, most had their activity recorded. Similarly recorded was the usage of databases and knowledge or information repositories but none of the organizations felt they did anything constructive with the results.

One part of one business was exploring the use of qualitative knowledge management measures within a balanced scorecard approach. Two organizations use case studies and stories to illustrate the involvement of knowledge sharing in successes and one included a small number of knowledge sharing questions in a quarterly attitudinal survey of staff.

5.3 CROSS-CASE SUMMARY

This chapter has examined the data across organizations. The preceding discussions are summarised below. (Table 27).

Strategy	• The seriousness of top level management buy-in was suspect. • Only one of the organizations had an explicit top level KM or KS strategy or a board level member focussed on knowledge sharing. The lack of senior management buy-in is an **inhibitor** while the existence of a strategy (formal or otherwise) can be a **enabler**.
Structure	• Knowledge sharing does not work well across large organizations. • Departments become 'silos' of knowledge. • No one has found any obvious solution to this problem although a number have been tried. The sheer size of large organizations inhibits knowledge sharing but this research shows no evidence that any particular structure is an **enabler** or an **inhibitor**.
People	• There is little to motivate people to share knowledge. The lack of motivation is driven by both a lack of time and a lack of measurement. • Reward systems emphasise expertise over sharing and 'knowledge is power' motivates against sharing. It was felt that peer acclaim motivates people to share more than financial reward. • The culture of 'knowledge is power' is still prevalent in many parts of organizations and the time constraints arising from a focus on the job in hand distracts people from sharing knowledge. • Only one organization was working through HR and training to embed knowledge sharing behaviours. In the others, skills and behaviours for KS were not well understood or indeed considered. How well people shared was very variable. A lack of motivation to share **inhibits** knowledge sharing as does a *knowledge is power* culture and a focus on client billable time. Training to help embed the right behaviours is an **enabler**.

Processes	• Although there were no high level business processes focussed specifically on KS, there was a view that processes in general often helped KS by encouraging workflow and interaction. • Localised process for things like 'Lessons Learnt' were in place in some organizations. Many processes are **enablers** of knowledge sharing simply be forcing people to communicate.
Technology	• There was a strong view that technology tools must be designed with users in mind and must be launched with adequate preparation, education and training. • First class search facilities are also vital as without the ability to find things, repositories are of little use. Technology can be a powerful **enabler** of knowledge sharing even when it is delivering primarily information – a prerequisite of knowledge. Poorly designed or dysfunctional technology can, on the other hand, be an **inhibitor**.
Linkages	• Where no corporate strategy of guidance for knowledge sharing exists, little deliberate alignment follows. Despite this, processes that are enabled by technology often result in alignment between these two areas and, sometimes, processes can also facilitate or enable sharing in the organization. There is too little evidence on linkages to suggest whether they are significant **enablers** or **inhibitors**.
Knowledge	• The majority of interviewees felt that knowledge needed people rather than just technology, but they still talked of their technology systems as 'storing knowledge'. • All agreed that users had no interest in the distinction between data, information and knowledge. • While some organizations had processes in place to collect knowledge in some form, few were very good at encouraging the re-use of knowledge so collected. Trying to explain concepts such as data-information-knowledge to users offered no benefits and was probably an **inhibitor** of knowledge sharing. Sharing was also **inhibited** by the fact that where knowledge was collected and stored by some means, there was rarely much incentive to re-use it.

Evaluation	• None of the organizations made any attempt at quantitative evaluation of the benefits of knowledge sharing. • Most recorded the use of repositories but none made any constructive use of the results. As the literature review pointed out, to manage something properly, it is necessary to measure it. Some form of evaluation could thus be an **enabler** of knowledge sharing.

Table 27: Cross-Case Summary

This chapter began by summarising the data across all the organizations. It then looked at commonalities in the data across all the organizations. Firstly, in terms of the areas of the research framework – strategy, structure, people, processes and technology – and subsequently in terms of linkages and other areas of commonality which arose. The chapter concluded with a summary of the cross-case discussions.

The next chapter will first look at the survey data and then discuss where it agrees and disagrees with the interview data.

6 SURVEY RESULTS

All companies who agreed to take part in the interviews were also asked to circulate a questionnaire among their staff as discussed in section 3.6 on research design. The survey was offered in a written format and as a web-based option; however, in all cases, only web-based responses were submitted. The web-based survey questionnaire is as shown in Appendix 1.

Four of the five companies agreed to undertake this survey (TelCo, LawCo, PubCo and EngCo). Despite continual calls and requests and repeated promises from senior executives, PubCo never provided any results so only three companies produced any results. The fifth company, ProfCo, while not prepared to take part in the survey, did provide data from their own internal surveys and this is discussed at the end of Section 6.2.

The development of the survey questions was discussed in section 3.6.4. There are 12 questions and for each question, the respondent was asked for a response using a 5 point Likert scale running from 'Strongly Agree' to 'Strongly Disagree'. The questions are now summarised below:

Q1 - We are a knowledge-intensive company.

This was a general question to confirm that the respondents did believe that knowledge was important to the organization.

Q2 - Knowledge sharing is commonplace in my company.

This question is looking at communications flow and checking to what extent respondents believe that knowledge sharing is taking place.

Q3 - We are good at knowledge sharing and it fully meets the needs of the business

Having ascertained whether or not the respondents think knowledge sharing is commonplace, this question seeks to ascertain whether they feel that the company is any good at it.

Q4 - Knowledge sharing improves the overall performance of my company

This question aims to find out if the respondents believe that whatever knowledge sharing takes place has an effect on the organization's bottom line.

Q5 - In general, knowledge sharing and learning are valued by my company culture

Question 5 asks the respondents whether they believe that the culture of the organization values knowledge sharing.

Q6 - Individuals are recognised and regarded for sharing knowledge

Question 6 builds on the preceding question. If the company truly values knowledge sharing, then individuals should be recognised and/or rewarded for doing it.

Q7 - The senior management of my company are serious about encouraging knowledge sharing

The last two questions looked at corporate support for knowledge sharing. This one looks at the more specific area of support from senior management.

Q8 - I have access to the technology I need to support knowledge sharing

This question looks at the availability of technology.

Q9 - My company evaluates the benefits of sharing knowledge

This question is about perceptions of evaluation and measurement – do the respondents believe it takes place.

Q10 - My company has business processes in place to support knowledge sharing

This question aims to see if there is a perception that business processes are in place which support knowledge sharing.

Q11 - The sharing of knowledge within my company is continually improving

Question 11 is looking for views on the development of knowledge sharing – do the respondents believe that it is continuing to improve or not.

Q12 - Our company is better at sharing knowledge than our competitors

This question is based on perceptions even more than the others. It does, however, give some idea of their general level of optimism or pessimism about knowledge sharing in their organization based on any knowledge they may have about their competitors.

The next section discusses the respondents to the survey. The second section considers the data on a company by company basis and the subsequent section across companies. The final section summarises and discusses the data.

6.1 RESPONDENTS

The distribution of the survey was controlled entirely by the organization concerned although each was asked to circulate it as widely as possible to a large cross-section of employees.

Respondents were asked to give their job description and these are summarised in Table 28, Table 29 and Table 30. A full listing of the job descriptions is given in Appendix 4.

Account Manager/Director	11
Sales/Marketing Manager	15
Sales/Marketing Staff	9
Other Management	6
Other	1

Table 28: TelCo Survey Respondents (42)

TelCo respondents are thus primarily marketing oriented but cover a fairly wide range of levels of seniority. None are directly involved with KM.

Partner	1
Customer-facing Lawyer	17
Professional Support Lawyer (PSL)	7
Trainee Lawyer	4
KM Group	2

Table 29: LawCo Respondents (31)

LawCo respondents are mostly lawyers. There was a fairly good spread of seniority and some are directly involved with KM (the KM group and the PSLs).

Engineering Management	16
Engineering	16
Other management	3
KM-related staff	3
Other	5

Table 30: EngCo Respondents (43)

Within EngCo, the majority of the respondents were engineers at varying levels of seniority but there were some respondents from other areas including the KM group.

6.2 SURVEY DATA BY COMPANY

The results of the survey for each of the three organizations which returned data are summarised in the next three sections along with the descriptive statistics of the results. At the end of each section, the survey data is compared and contrasted with the interview data.

Detailed statistical results and boxplots are given in Appendix 2 and the 'by company' histograms in Appendix 3.

6.2.1 TELCO RESULTS

	Mean	Std. Deviation	Min	Max	Skewness	
					Statistic	Std. Error
We are a knowledge-intensive company.	4.47	1.008	1	5	-2.385	0.361
My company has business processes in place to support knowledge sharing.	3.86	0.966	2	5	-0.374	0.361
The sharing of knowledge within my company is continually improving.	4.00	0.951	1	5	-1.045	0.361
Our company is better at sharing knowledge than our competitors.	3.63	1.047	1	5	-0.356	0.361
Knowledge sharing is commonplace in my company.	4.05	1.075	1	5	-1.313	0.378
We are good at knowledge sharing and it fully meets the needs of the business.	3.37	1.001	1	5	-0.378	0.361
Knowledge sharing improves the overall performance of my company	4.44	1.076	1	5	-2.430	0.361
In general, knowledge sharing and learning are valued by my company culture.	4.33	0.865	1	5	-1.858	0.361
Individuals are recognised and regarded for sharing knowledge.	3.63	1.092	1	5	-0.344	0.361
The senior management of my company are serious about encouraging knowledge sharing.	4.07	1.078	1	5	-0.982	0.361
I have access to the technology I need to support knowledge sharing.	4.05	1.112	1	5	-1.295	0.361
My company evaluates the benefits of sharing knowledge.	3.42	1.159	1	5	-0.225	0.361

Table 31: TelCo Survey Results

The respondents have a consistent view of TelCo as a knowledge-intensive company – virtually all respondents agreed or strongly agreed. A large majority believe that knowledge sharing would improve the company's performance. Most respondents see knowledge sharing as commonplace but as to whether the

company is good at knowledge sharing and whether it meets the needs of the business, the responses here are more evenly spread. Although a large majority think that knowledge sharing is valued within the company culture, there is a wide spread of views as to whether it is recognised or rewarded. Despite this spread of views on recognition or reward, most respondents felt that senior management were serious about encouraging knowledge sharing. This raises the question of why management do not reward knowledge sharing more as they are thought to be so supportive. A large majority believe that good technology support for knowledge sharing is available to them. Views on whether the company evaluates the benefits of knowledge sharing are quite evenly spread. The question on business processes to support knowledge sharing has a fairly wide spread of responses suggesting that some level of process support is perceived by most respondents. A majority of respondents thought that knowledge sharing was improving to some extent in the company. As to whether the company was better than its competitors at knowledge sharing, the respondents varied widely in their views but overall slightly more agreed than disagreed.

The case study in chapter 4 suggested that this organization had neither an overall strategy for knowledge sharing nor anyone with board level responsibility for it. There was little to motivate people to share; processes only support knowledge sharing by chance and there was an enormous level of technological capability but most of it was directed at data and information sharing.

Views on whether this was a knowledge intensive company; whether they were good at knowledge sharing; whether knowledge sharing would improve the company's performance; whether supportive technology was in place; whether business process support was in place and whether knowledge sharing was improving within the company were broadly concordant between the interviewees and the survey respondents. Differing views were apparent where respondents felt that knowledge sharing was widespread, was valued by the company, was promoted and supported by senior management and had its benefits measured.

This divergence of views is probably due to the fact that all the interviewees were, directly or indirectly, involved with knowledge sharing while none of the survey respondents were involved. If this is coupled with the interviewee comments that the differentiation of data, information and knowledge were of little interest to, and poorly understood by, most users then it is likely that the survey respondents do not perceive the difference between what is information sharing (which the organization is quite good at) and what is knowledge sharing. This differences in perception may also be shared by senior management which could account for the lack of active support for knowledge sharing.

6.2.2 LawCo Results

	Mean	Std. Deviation	Min	Max	Skewness	
					Statistic	Std. Error
We are a knowledge-intensive company.	4.81	0.402	4	5	-1.631	0.421
My company has business processes in place to support knowledge sharing.	3.26	1.154	1	5	-0.544	0.421
The sharing of knowledge within my company is continually improving.	3.19	0.946	1	5	-0.666	0.421
Our company is better at sharing knowledge than our competitors.	2.81	0.980	1	4	-0.719	0.421
Knowledge sharing is commonplace in my company.	3.87	0.957	2	5	-0.459	0.421
We are good at knowledge sharing and it fully meets the needs of the business.	3.10	0.870	1	4	-0.845	0.421
Knowledge sharing improves the overall performance of my company	4.71	0.529	3	5	-1.672	0.421
In general, knowledge sharing and learning are valued by my company culture.	3.71	1.189	1	5	-0.792	0.421
Individuals are recognised and regarded for sharing knowledge.	2.97	1.197	1	5	0.066	0.421
The senior management of my company are serious about encouraging knowledge sharing.	3.39	1.174	1	5	-0.569	0.421
I have access to the technology I need to support knowledge sharing.	3.13	1.335	1	5	-0.341	0.421
My company evaluates the benefits of sharing knowledge.	2.55	1.028	1	4	-0.336	0.421

Table 32: LawCo Survey Results

Virtually all the respondents strongly believe LawCo is a knowledge intensive firm. However, views on whether knowledge sharing is widespread are quite varied although generally in agreement. Views on whether knowledge sharing meets the needs of the business are widely spread but generally lower on the response scale. However, there is considerable agreement that knowledge sharing would improve company performance. There are many views as to how much knowledge sharing and learning are valued by the company although slightly more agree than disagree. There is a similar spread of views on the idea that people are recognised for sharing but even more disagree. Views about senior management support also vary and are only slightly over the median. There is very little consensus about the availability of suitable technology. Although there is a wide range of responses, there is not strong support for the view that the company evaluates the benefits of knowledge sharing. There is a similar lack of consensus on the support business processes may give to knowledge sharing. As to whether knowledge sharing is improving in the firm, more respondents were neutral or disagreed than agreed. There is a fairly wide spread of responses about the firms competitive position in knowledge sharing but most were neutral or not in agreement.

The interview data in chapter 4 suggested that there was no formal strategy or partner-level responsibility for knowledge sharing although work was in hand to develop a strategy (driven from a middle level of management). There also appeared to be a general desire to share, tempered by a fixation with maximising the time booked to clients and there were no motivational factors to counter this. The firm has few processes in place and technology is focussed heavily on providing repositories of information.

Much of the survey data is generally in agreement with the results of the interview. The survey data suggested that they thought they were quite good at sharing which is partly true at the smaller departmental or group level. As in the interviews, the value of knowledge sharing was recognised but there was no particular feeling that they were recognised or rewarded for it. The survey data showed some support for the idea that processes were in place to support

knowledge sharing, which conflicted with the evidence from the interviews. The survey also showed a wide spread of views about senior management support whereas the interviewees were more negative about this. Similarly, there was some support in the survey for the idea that the necessary technology for knowledge sharing was available while, again, the interviewees were less positive. As mentioned with TelCo, this may be due to a lack of perception of the difference between information sharing and knowledge sharing – only 30% of the survey respondents were involved directly with knowledge sharing.

6.2.3 *ENGCO RESULTS*

	Mean	Std. Deviation	Min	Max	Skewness	
					Statistic	Std. Error
We are a knowledge-intensive company.	4.47	0.896	1	5	-2.461	0.403
My company has business processes in place to support knowledge sharing.	3.41	0.821	1	5	-0.922	0.403
The sharing of knowledge within my company is continually improving.	3.50	0.788	2	5	-0.395	0.403
Our company is better at sharing knowledge than our competitors.	2.56	0.824	1	4	-0.372	0.403
Knowledge sharing is commonplace in my company.	3.32	0.843	1	5	-0.694	0.403
We are good at knowledge sharing and it fully meets the needs of the business.	2.53	0.748	1	4	-0.337	0.403
Knowledge sharing improves the overall performance of my company	4.15	0.989	2	5	-0.911	0.403
In general, knowledge sharing and learning are valued by my company culture.	3.53	0.896	2	5	-0.228	0.403
Individuals are recognised and regarded for sharing knowledge.	2.68	0.843	1	4	-0.597	0.403
The senior management of my company are serious about encouraging knowledge sharing.	3.03	1.029	1	5	0.116	0.403
I have access to the technology I need to support knowledge sharing.	2.91	1.111	1	5	0.183	0.403
My company evaluates the benefits of sharing knowledge.	2.68	1.007	1	5	0.335	0.403

Table 33: EngCo survey Results

The great majority of EngCo respondents see the firm as knowledge-intensive and most respondents either agreed or were neutral about the idea that knowledge sharing was commonplace. On the other hand, most respondents either disagreed or were neutral to the view that the company was good at

sharing knowledge. Many respondents supported the view that knowledge sharing improves company performance. A slight majority of respondents have a positive view of the company culture in relation to knowledge sharing but nearly as many were neutral or negative. Most were neutral to or disagreed with the idea that knowledge sharing is recognised or rewarded in any way. Views on senior management support for knowledge sharing are very evenly divided; those on the availability of technology have a small majority disagreeing. The respondents are not convinced that the company evaluates the benefits of knowledge sharing but most respondents are either neutral or agreed with the view that process support for knowledge sharing is in place. Views on the continuing improvement of knowledge sharing are generally similar. Finally, respondents were generally neutral or pessimistic about knowledge sharing comparisons with their competitors.

The interview data in chapter 4 suggested that although there was a feeling that the importance of knowledge sharing was recognised at the top level, there was little concrete support and no overall strategy. Recognition or reward for sharing varies across the organization from nonexistent to almost negligible. The company is very process-oriented and although some purport to be aimed at aspects of knowledge sharing, in reality, most are more about collecting data or information. The use of technology is very variable and disjointed but most is focussed on data and information sharing.

As with the other organizations, there was general agreement between interviewees and survey respondents in many areas. However, in three areas survey respondents were more supportive of a question than the interviewees. First, about the idea that knowledge sharing was commonplace in the organization; next, about the level of senior management support and finally, about the level of technology support. As with TelCo, all the interviewees were directly involved with KM while this was not the case for most of the survey respondents and a lack of perception of the difference between data, information and knowledge could be the cause of these varying views in the case of the first and last areas mentioned. In the other area, that of senior management support,

it may be that those not involved directly with knowledge management do not realise that all the management talk about KM is not always translated into active support and action.

6.2.4 PROFCO SURVEY DATA

ProfCo did not take part in the survey, but did provide information from their own internal surveys. They undertake a quarterly attitudinal survey of all staff which includes four questions concerning knowledge management. These questions are:

Q1 - The information I need to do my job is easily accessible.

Q2 - I am recognised and rewarded for sharing knowledge.

Q3 - The people I work for encourage me to share knowledge with others.

Q4 - I have seen evidence that initiatives to support knowledge sharing are being implemented in my group.

The information provided was for Q4 2006 with historical data going back over 12 quarters to Q1 2004. 3307 employees completed the survey – a response rate of 70%.

Results were presented as the percentage of responses agreeing with each of the above four statements and were given for each of four main divisions and overall:

	Division 1	Division 2	Division 3	Division 4	Overall
The information I need to do my job is easily accessible	90.0	89.7	90.2	86.4	89.1
I am recognised and rewarded for sharing knowledge	74.6	72.3	71.0	67.0	71.2
The people I work for encourage me to share knowledge with others	91.8	87.9	87.7	89.1	89.1
I have seen evidence that initiatives to support knowledge sharing are being implemented in my group	81.0	82.4	79.7	84.4	81.9

Table 34: ProfCo Survey Data

Although these results cannot be directly compared with those of the research survey, they do show a high level of agreement with the questions concerned. The great majority of respondents believe they are rewarded for knowledge sharing, encouraged to share, have access to the information they need and see ongoing knowledge sharing initiatives.

In addition, the company has seen these figures generally improve over time. See, for example, Figure 25 which shows the data for one particular group.

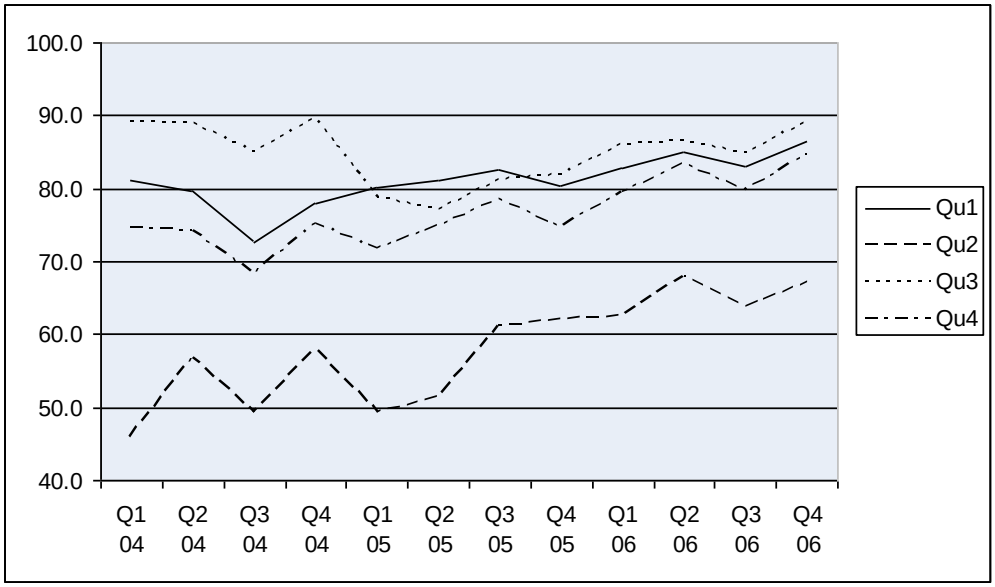

Figure 25: Advisory Group Responses

This shows that questions 1, 2 and 4 have shown an upward trend over time while question 3 – about encouragement to share – has remained at a steady, high level. The other groups show similar trends.

Overall, the survey which showed a very high level of encouragement to share, high availability of information and a general high visibility of the importance of knowledge sharing. These results are generally in keeping with the interview responses, especially allowing for the fact that all the interviewees were directly involved with knowledge management.

6.3 SURVEY DATA ACROSS COMPANIES

This section will consider the survey data across companies on a question by question basis.

A one-way ANOVA (analysis of variance) is used which tests the null hypothesis that "*two or more samples were drawn from the same population by comparing the variance of the sample means (*between groups *variance) with the 'error' or within groups variance (an average of the variances within each sample around its mean). If means differ among themselves far more than people differ* within *groups then the F ratio will be higher than 1 to a significant extent*". (Coolican, 1999, p.389) Possible differences in response between the organizations can then be identified and discussed.

ANOVA requires that the data be normally distributed but this becomes less critical with more than 30 responses. In addition, groups should have similar variance but again this has little effect provided the largest group is not more than 1.5 times the size of the smallest group (Saunders, Lewis, & Thornhill, 1997). These two requirements are both met by the data. Levene's test of equality of error variance - where non-significance of the F statistic indicates that the assumption of homogeneity of variance is tenable – was also run for each question to ascertain that the data met the necessary assumptions. If the significance from this test is less than 0.05 then the variances are significantly different and parametric tests like ANOVA could give erroneous results. The results are given in Table 35.

Question	F	Sig.
Q1	5.275	.006
Q2	0.459	.633
Q3	1.688	.189
Q4	3.304	.040
Q5	2.602	.079
Q6	0.388	.679
Q7	0.393	.676
Q8	2.866	.061
Q9	0.883	.416
Q10	2.473	.089
Q11	0.261	.770
Q12	0.993	.374

Table 35: Results of Levene's Test

Only for Q1 and Q4 are F significant so the ANOVA is valid for all the other questions. For Q1 and Q4, an alternative non-parametric test must be used and a commonly used non-parametric equivalent to ANOVA is the Kruskal-Wallis k-sample test where "*the data are converted to ranks and the distribution of ranks among the various groups determines the value of the test statistic*" (Kinnear & Gray, 2006, p.260).

For each question a number of statistics are given. First, either the Kruskal-Wallis test is shown (Q1 and Q4) or, for the other questions, the tests of between-subjects effects are shown. For these latter tests, df1 (degrees of freedom for the numerator) is 2 and df2 (degrees of freedom for the denominator) is 114. Putting these values into standard statistical tables gives a critical value for F at the 5% significance level of 3.12. An F statistic less than this will support the null hypothesis that the responses are comparable across the companies. If this proves not to be the case, Tukey's *honestly significant difference* test is included to indicate homogeneous subgroups. Finally, for the parametric tests, a chart of estimated marginal means graphically displays any variation.

The results for each question are then briefly discussed.

Q1 - We are a knowledge-intensive company

Ranks

	Company	N	Mean Rank
We are a knowledge-intensive company	TelCo	43	57.40
	Law Co	31	66.35
	EngCo	43	55.30
	Total	117	

Test Statistics[a,b]

	We are a knowledge-intensive company
Chi-Square	3.162
df	2
Asymp. Sig.	.206

a. Kruskal Wallis Test

b. Grouping Variable: Company

Figure 26: Q1 Cross-company statistics

Here the Kruskal-Wallis chi-square test is not significant beyond the .01 level: χ^2 (2) = 3.162; p > .01. All three organizations are thus in close agreement supporting the view that they are knowledge-intensive companies.

Q2 - Knowledge sharing is commonplace in my company

Tests of Between-Subjects Effects

Dependent Variable: Knowledge sharing is commonplace in my company

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Company	9.697	2	4.849	5.273	.006	.085
Error	104.833	114	.920			
Total	1717.000	117				

nowledge sharing is commonplace in my compan

Tukey HSD[a,b,c]

Company	N	Subset 1	Subset 2
EngCo	43	3.33	
Law Co	31		3.87
TelCo	43		3.95
Sig.		1.000	.925

a. Uses Harmonic Mean Sample Size = 38.086.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

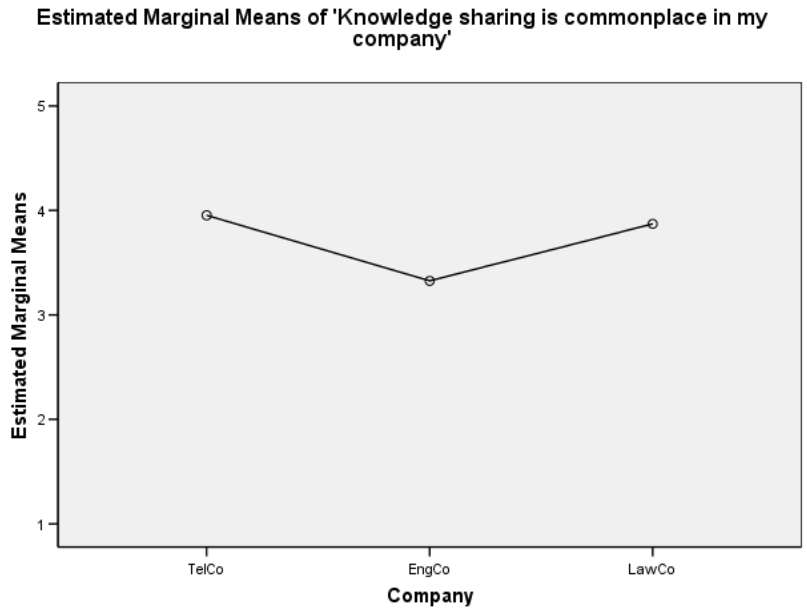

Figure 27: Q2 Cross-company statistics

In this case, F is above the critical value of 3.12 and the Tukey analysis show that two sub-groups exist. TelCo and LawCo are in close agreement whereas

EngCo is **slightly** less supportive of the view that knowledge sharing is commonplace in the company.

Q3 - We are good at knowledge sharing and it fully meets the needs of the business

Tests of Between-Subjects Effects

Dependent Variable: We are good at knowledge sharing and it fully meets the needs of the business

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Company	17.423	2	8.711	11.350	.000	.166
Error	87.500	114	.768			
Total	1140.000	117				

We are good at knowledge sharing and it fully meets the needs of the business

Tukey HSD[a,b,c]

Company	N	Subset 1	Subset 2
EngCo	43	2.49	
Law Co	31		3.10
TelCo	43		3.37
Sig.		1.000	.359

a. Uses Harmonic Mean Sample Size = 38.086.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

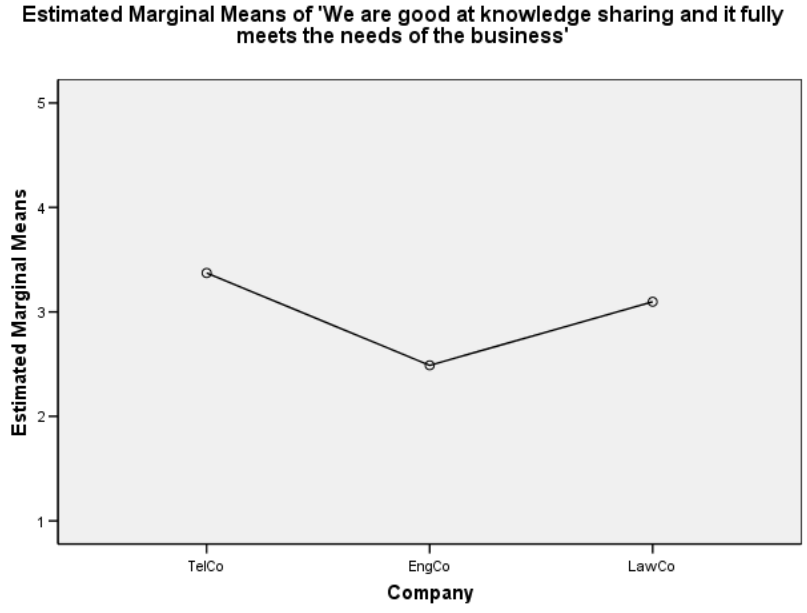

Figure 28: Q3 Cross-company statistics

Once again, the F statistic is high and the results exhibit two sub-groups with TelCo and LawCo having a higher level of support for the idea that knowledge sharing fully meets the needs of the organization than EngCo.

Q4 - Knowledge sharing improves the overall performance of my company

Ranks

	Company	N	Mean Rank
Knowledge sharing improves the overall performance of my company	TelCo	43	62.20
	Law Co	31	67.45
	EngCo	43	49.71
	Total	117	

Test Statistics[a,b]

	Knowledge sharing improves the overall performance of my company
Chi-Square	7.414
df	2
Asymp. Sig.	.025

a. Kruskal Wallis Test

b. Grouping Variable: Company

Figure 29: Q4 Cross-company statistics

Here, as with Q1, the Kruskal-Wallis chi-square test is not significant beyond the .01 level:

χ^2 (2) = 7.414; p > .01. All three organizations are thus in close agreement supporting the view that knowledge sharing improves the overall performance of the company.

Q5 - In general, knowledge sharing and learning are valued by my company culture

Tests of Between-Subjects Effects

Dependent Variable: In general, knowledge sharing and learning are valued by my company culture

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Company	1768.473	3	589.491	630.847	.000	.943
Error	106.527	114	.934			
Total	1875.000	117				

ı general, knowledge sharing and learning are valued by my company culture

Tukey HSD[a,b,c]

Company	N	Subset 1	Subset 2
EngCo	43	3.53	
Law Co	31	3.71	
TelCo	43		4.33
Sig.		.710	1.000

a. Uses Harmonic Mean Sample Size = 38.086.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

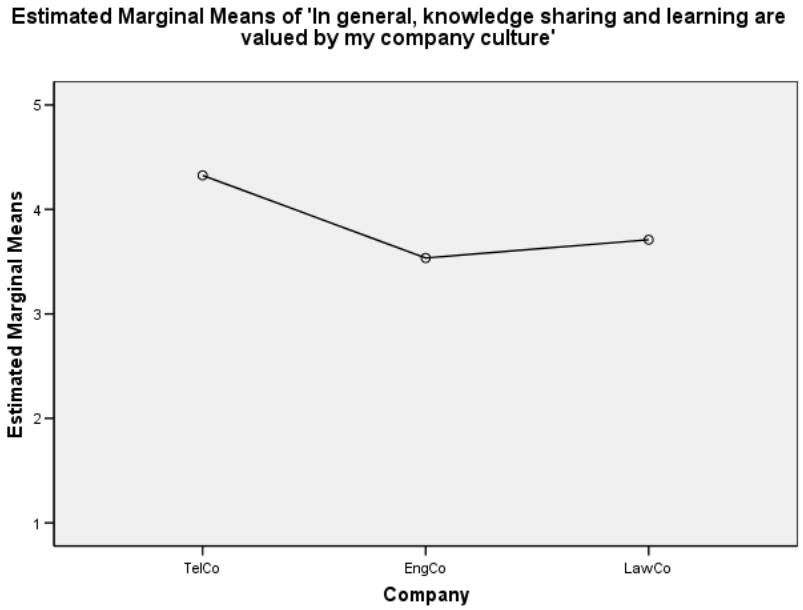

Figure 30: Q5 Cross-company statistics

Once again, the F statistic is very high (630) and the results exhibit two sub-groups with TelCo having a higher level of support for the idea that 'knowledge sharing and learning are valued by the company culture' than EngCo and LawCo.

Q6 - Individuals are recognised and regarded for sharing knowledge

Tests of Between-Subjects Effects

Dependent Variable: Individuals are recognised and regarded for sharing knowledge

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Company	1135.939	3	378.646	324.406	.000	.895
Error	133.061	114	1.167			
Total	1269.000	117				

Individuals are recognised and regarded for sharing knowledge

Tukey HSD[a,b,c]

Company	N	Subset 1	Subset 2
EngCo	43	2.63	
Law Co	31	2.97	
TelCo	43		3.63
Sig.		.359	1.000

a. Uses Harmonic Mean Sample Size = 38.086.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

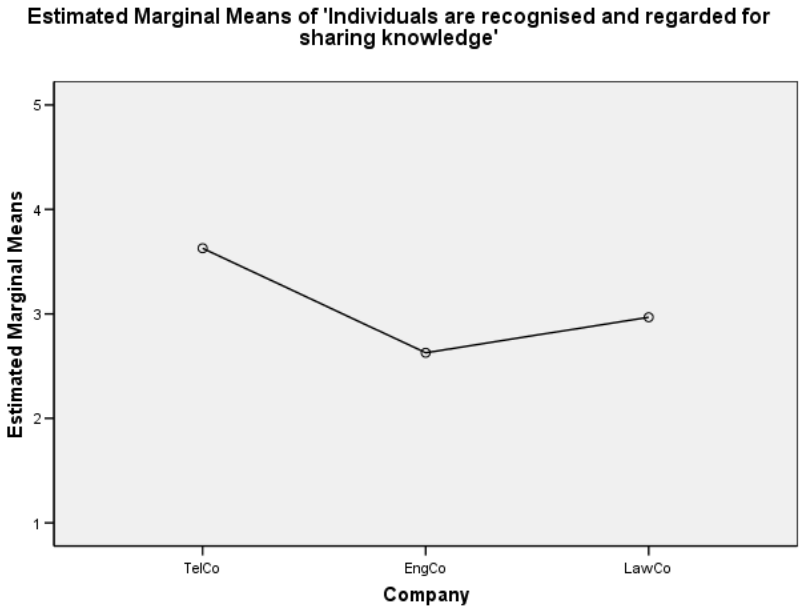

Figure 31: Q6 Cross-company statistics

Again, the F statistic is high (378) and the results exhibit two sub-groups with TelCo having a higher level of support for the idea that 'individuals are recognised and rewarded for sharing knowledge' than EngCo and LawCo.

Q7 - The senior management of my company are serious about encouraging knowledge sharing

Tests of Between-Subjects Effects

Dependent Variable: The senior management of my company are serious about encouraging knowledge sharing

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Company	1448.878	3	482.959	401.520	.000	.914
Error	137.122	114	1.203			
Total	1586.000	117				

The senior management of my company are serious about encouraging knowledge sharing

Tukey HSD[a,b,c]

Company	N	Subset 1	Subset 2
EngCo	43	2.98	
Law Co	31	3.39	
TelCo	43		4.07
Sig.		.236	1.000

a. Uses Harmonic Mean Sample Size = 38.086.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

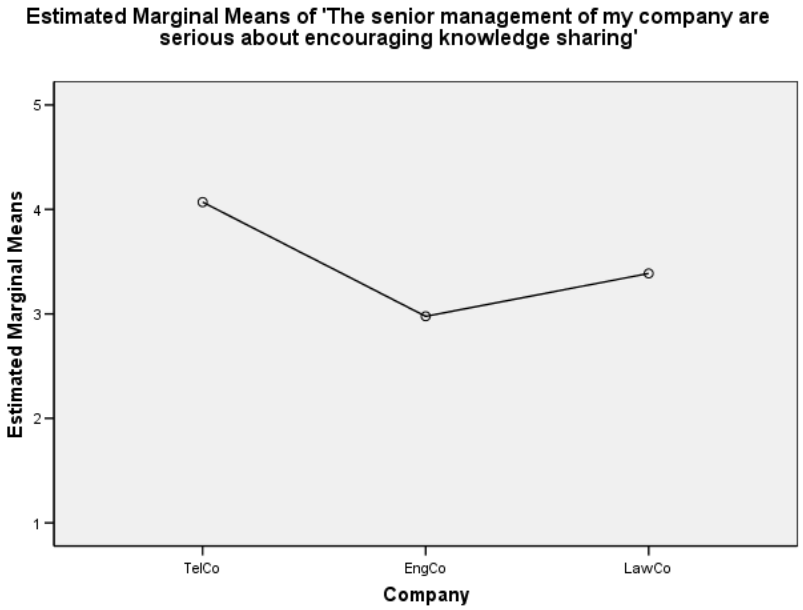

Figure 32: Q7 Cross-company statistics

Once again, the F statistic is very high (401) and the results again exhibit two sub-groups. Once more, TelCo exhibits a higher level of support for the idea that their senior management are serious about supporting knowledge sharing than EngCo and LawCo.

Q8 - I have access to the technology I need to support knowledge sharing

Tests of Between-Subjects Effects

Dependent Variable: I have access to the technology I need to support knowledge sharing

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Company	29.733	2	14.866	11.137	.000	.163
Error	152.182	114	1.335			
Total	1529.000	117				

I have access to the technology I need to support knowledge sharing

Tukey HSD[a,b,c]

Company	N	Subset 1	Subset 2
EngCo	43	2.93	
Law Co	31	3.13	
TelCo	43		4.05
Sig.		.734	1.000

a. Uses Harmonic Mean Sample Size = 38.086.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

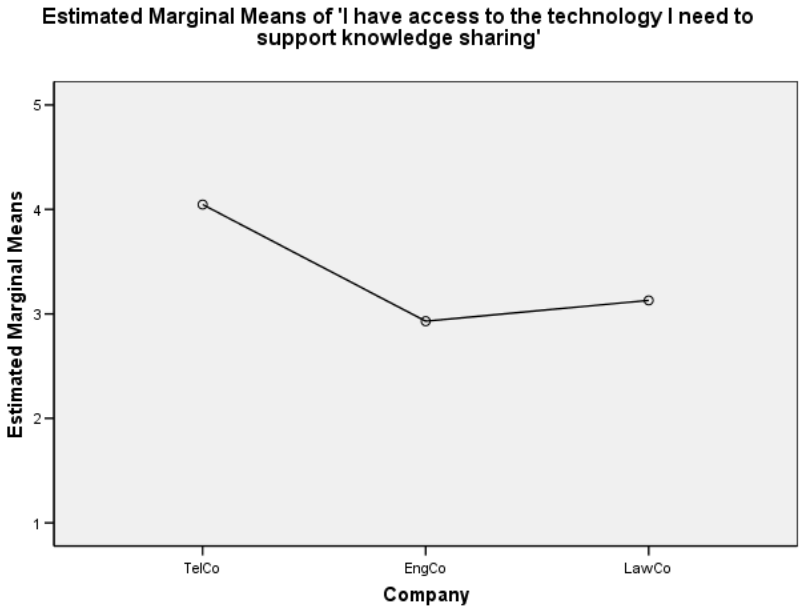

Figure 33: Q8 Cross-company statistics

Once again, the F statistic is above its critical value of 3.12 and the results exhibit two sub-groups with TelCo's respondents believing they have better access to knowledge sharing technology than EngCo and LawCo.

Q9 - My company evaluates the benefits of sharing knowledge

Tests of Between-Subjects Effects

Dependent Variable: My company evaluates the benefits of sharing knowledge

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Company	1016.788	3	338.929	299.027	.000	.887
Error	129.212	114	1.133			
Total	1146.000	117				

y company evaluates the benefits of sharing knowledg

Tukey HSD[a,b,c]

Company	N	Subset 1	Subset 2
Law Co	31	2.55	
EngCo	43	2.70	
TelCo	43		3.42
Sig.		.814	1.000

a. Uses Harmonic Mean Sample Size = 38.086.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

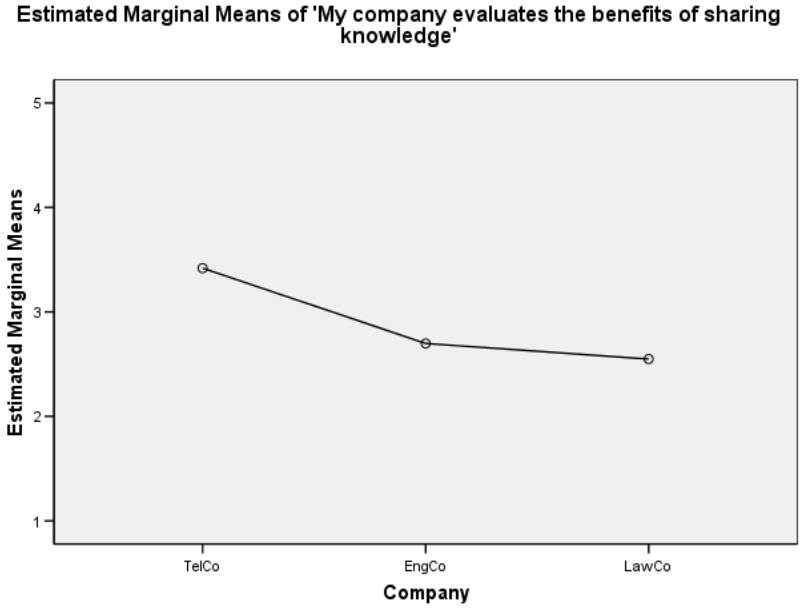

Figure 34: Q9 Cross-company statistics

Once again, the F statistic is high (299) and the results exhibit two sub-groups with TelCo having a higher level of support for the idea that their company evaluates the benefits of knowledge sharing than EngCo and LawCo.

Q10 - My company has business processes in place to support knowledge sharing

Tests of Between-Subjects Effects

Dependent Variable: My company has business processes in place to support knowledge sharing

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Company	1445.460	3	481.820	506.057	.000	.930
Error	108.540	114	.952			
Total	1554.000	117				

My company has business processes in place to support knowledge sharing

Tukey HSD[a,b,c]

Company	N	Subset 1	Subset 2
LawCo	31	3.26	
EngCo	43	3.33	
TelCo	43		3.86
Sig.		.951	1.000

a. Uses Harmonic Mean Sample Size = 38.086.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

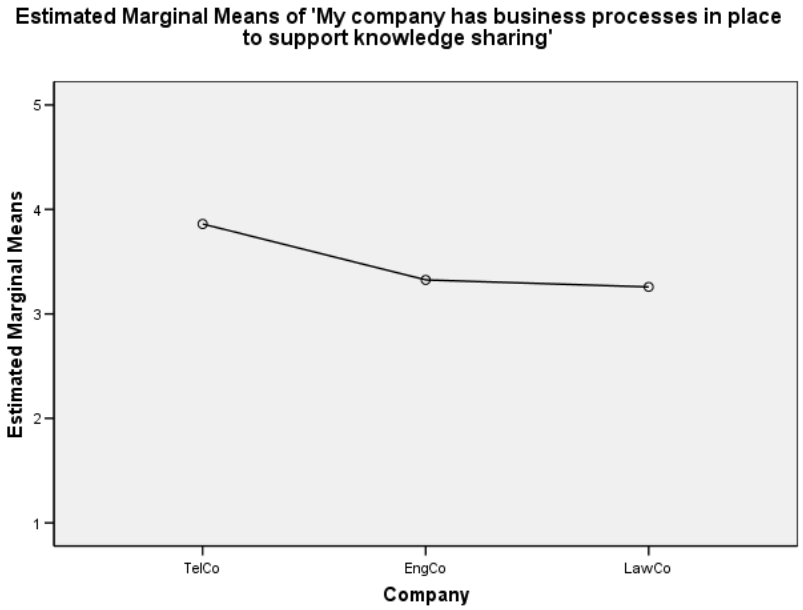

Figure 35: Q10 Cross-company statistics

Again, the F statistic is very high (506) and the results exhibit two relatively close sub-groups with TelCo having a slightly higher level of support than EngCo and LawCo for the idea that the company has business processes in place to support knowledge sharing.

Q11 - The sharing of knowledge within my company is continually improving

Tests of Between-Subjects Effects

Dependent Variable: The sharing of knowledge within my company is continually improving

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Company	1513.557	3	504.519	643.034	.000	.944
Error	89.443	114	.785			
Total	1603.000	117				

The sharing of knowledge within my company is continually improving

Tukey HSD[a,b,c]

Company	N	Subset 1	Subset 2
Law Co	31	3.19	
EngCo	43	3.44	
TelCo	43		4.00
Sig.		.442	1.000

a. Uses Harmonic Mean Sample Size = 38.086.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

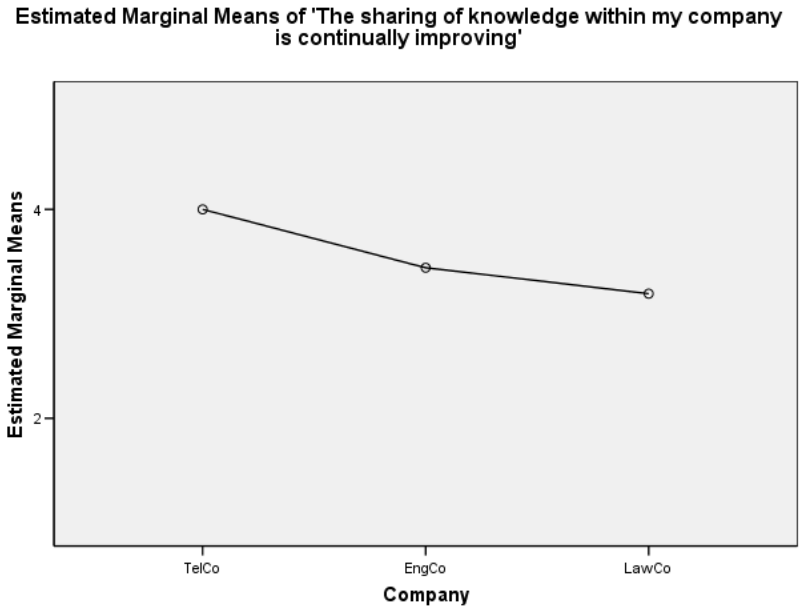

Figure 36: Q11 Cross-company statistics

The F statistic is still very high (504) and the results exhibit two sub-groups with TelCo again having a higher level of support than EngCo and LawCo for the idea that knowledge sharing within the company is improving.

Q12 - Our company is better at sharing knowledge than our competitors

Tests of Between-Subjects Effects

Dependent Variable: Our company is better at sharing knowledge than our competitors

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Company	1066.510	3	355.503	384.183	.000	.910
Error	105.490	114	.925			
Total	1172.000	117				

Our company is better at sharing knowledge than our competitors

Tukey HSD[a,b,c]

Company	N	Subset 1	Subset 2
EngCo	43	2.44	
Law Co	31	2.81	
TelCo	43		3.63
Sig.		.228	1.000

a. Uses Harmonic Mean Sample Size = 38.086.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

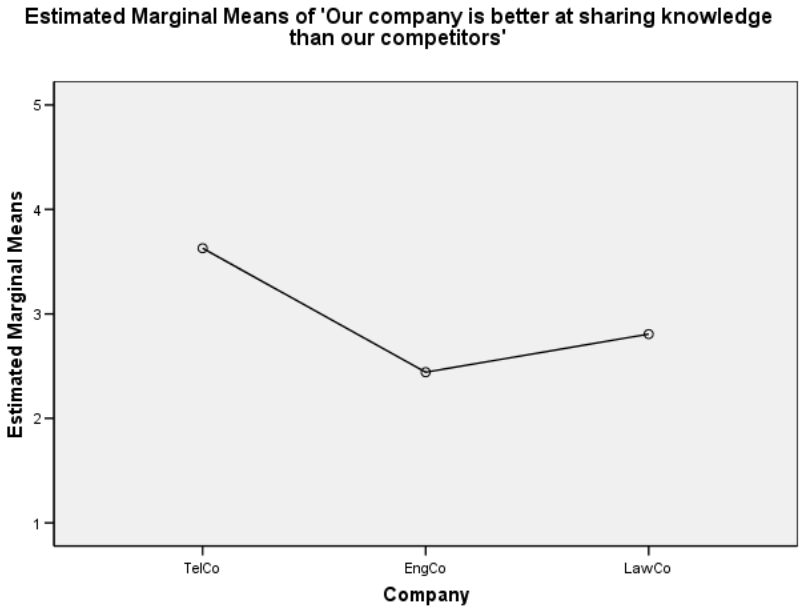

Figure 37: Q12 Cross-company statistics

Finally, the F statistic is still high (384) and the results exhibit two sub-groups with TelCo respondents having a higher level of belief that they are better at knowledge sharing than their competitors than EngCo and LawCo.

6.4 SUMMARY

The overall survey data for each organization has been discussed in 6.2.

The results for TelCo (Table 36: Telco Responses) showed generally positive

Overall Response	**Questions**
Positive	1, 2, 4, 5, 6, 7, 8, 10, 11, 12
Neutral	3, 9
Negative	

Table 36: Telco Responses

results for most of the questions with the exception of questions 3 and 9. There was a wide spread of views for these two questions suggesting the respondents did not have a clear view of whether the organization was good at knowledge sharing, whether it met the needs of the business and whether the benefits of knowledge sharing were evaluated. In all other areas they were quite positive.

The results for LawCo (Table 37) were considerably less positive. The only

Overall Response	**Questions**
Positive	1, 2, 4, 5,
Neutral	3, 6, 7, 8, 10, 11
Negative	9, 12

Table 37: LawCo Responses

areas of strong agreement were that they were a knowledge-intensive company; that knowledge sharing was commonplace; that it would improve performance; and that it was valued in the company culture. In most of the other questions,

opinion was fairly widely spread except for question 9 which showed that most people felt the benefits of knowledge sharing were not evaluated.

EngCo respondents had fairly widely spread but evenly balanced views on

Overall Response	Questions
Positive	1, 2, 4, 5, 10, 11
Neutral	7, 8,
Negative	3, 6, 9, 12

Table 38: EngCo Responses

management support and the availability of technology. Like both the other organizations, there was little support for the view that they were good at knowledge sharing, that knowledge sharing was recognised or rewarded or that the company evaluated the benefits of knowledge sharing. Other areas were generally positive.

The information provided by ProfCo from their own survey shows an organization that encourages and rewards knowledge sharing and continues to try and improve it.

Looking at the survey data cross-company, only for two questions was the data from all three companies consistent: 'We are a knowledge-intensive company' and 'knowledge sharing improves company performance'. For all the other questions, the statistics show two sub-groups in the results. This is shown diagrammatically in where ↑ or ↓ signifies that this company was 'on its own' and whether its mean response was higher or lower than for the sub-group containing the other two groups.

Question	TelCo	LawCo	EngCo
1			
2			↓
3			↓
4			
5	↑		
6	↑		
7	↑		
8	↑		
9	↑		
10	↑		
11	↑		
12	↑		

Table 39: Cross-Company response Grouping

In questions 2 and 3 – asking whether knowledge sharing was commonplace and whether the organization was good at it – EngCo was more pessimistic than the other two. For all the other questions, LawCo and EngCo were in one sub-group and TelCo was the 'odd one out' with a more positive view.

All the responses are, of course, based on the perceptions of the respondents. Without any further evidence, it is not possible to say whether those perceptions are based on fact or not. However, in this case, the data from the interviewees is also available.

Triangulation

Table 40 summarises the survey and interview responses for all the companies and indicates whether there was general agreement (**A**) or disagreement (**D**) between the two.

Question	TelCo	LawCo	EngCo
1	**A**	**A**	**A**
2	**D**	**A**	**D**
3	**A**	**A**	**A**
4	**A**	**A**	**A**
5	**D**	**A**	**A**
6	**D**	**A**	**A**
7	**D**	**D**	**D**
8	**D**	**D**	**D**
9	**D**	**A**	**A**
10	See text		
11	**A**	**A**	**A**
12	See text		

Table 40: Response Comparison

First, the questions where there was agreement across all the companies are considered. These are Q1 (We are a knowledge-intensive company); Q3 (We are good at knowledge sharing and it fully meets the needs of the business); Q4 (Knowledge sharing improves the overall performance of my company) and Q11 (The sharing of knowledge within my company is continually improving). It is perhaps not surprising that nearly everyone supports Q1 and Q4 as these are fairly basic questions which most people in these types of organization could be expected to answer in the affirmative. The same possibly applies to Q3 and Q11 – 'We aren't very good at it but we are getting better'. The interviewees know it isn't that good but are working to improve it and the survey respondents probably see this happening.

Next to be considered are the questions where the interviewees and the respondents disagreed across all the companies.

Q7 – 'The senior management of my company are serious about encouraging knowledge sharing'. In all cases, the interviewees were negative about the level of senior management support and commitment. On the other hand, the survey respondents were significantly more positive in their agreement with this statement. Many of the interviewees commented on how senior management

would frequently talk about the importance of KM or KS but would rarely match this with their actions. Perhaps the survey respondents, many of whom were not directly involved with KM, hear the talk, but are not close enough to the situation to realise that there is little or no follow up.

Q8 – 'I have access to the technology I need for knowledge sharing'. Here, the interviewees felt that the required technology was generally not available while the survey responses were much more variable. This may be due to the lack of understanding by many survey responders of the differences between information and knowledge. The organization **do** have considerable technology for sharing **information** and this may be where confusion arises.

Lastly, the remaining questions will be considered.

Q2 – 'Knowledge sharing is commonplace in my company'. There was agreement about this in LawCo, perhaps because sharing worked well at the small group level which was how the majority worked. Within TelCo and EngCo, the survey respondents were more positive about this question than the interviewees, perhaps due to confusion between knowledge and information – information sharing **was** commonplace.

Q5 – 'In general, knowledge sharing and learning are valued by my company culture'. There is agreement between survey responses and interviewees in LawCo and EngCo but within TelCo the survey respondents are more positive about this than the interviewees. This may be because the interviewees are all directly involved with KM and see little evidence to support this statement. However, this could be equally true in the other companies where a higher level of agreement is apparent.

Q6 – 'Individuals are recognised and regarded for sharing knowledge'. Within LawCo and EngCo, there was a high level of agreement that people were not recognised or rewarded for knowledge sharing while in TelCo, the survey respondents felt there was recognition but the interviewees were convinced that there wasn't. Respondents obviously felt they were being recognised and rewarded for *something* which they thought was to do with knowledge sharing.

Once again, this may be to do with information/knowledge confusion but further research within TelCo would be necessary to investigate further.

Q9 – 'My company evaluates the benefits of sharing knowledge'. Within LawCo and EngCo there was general agreement that no efforts at evaluation were made. TelCo interviewees thought the same but there was a wide spread of views from survey respondents with more than half thinking that evaluation took place. As the company does, to some extent, evaluate information and data sharing, perhaps this is where confusion arises.

Q10 – 'My company has business processes in place to support knowledge sharing'. In all cases, most of the interviewees said that processes existed which might help knowledge sharing even though they were not specifically aimed at knowledge sharing. There was general agreement with the survey question from many of the respondents. If the respondents were taking the question to apply to processes **specifically** to support knowledge sharing, then they are in disagreement with the interviewees. However they could be making the same interpretation as the interviewees and thus be in agreement. Perhaps this question could have been better worded as 'My company has business processes in place *specifically* to support knowledge sharing'.

Q10 will thus not be considered further in the discussion that follows and neither will Q12 as interviewees were not specifically asked about any comparison with their competitors.

Overall, out of 10 applicable questions, there was general agreement between interviewees and survey respondents on 4 questions in TelCo, 8 in LawCo and 7 in EngCo. As discussed above, 2 of the questions where disagreement was apparent were common to all organizations – Q7 and Q8. The discrepancies can perhaps be explained by the differing make up of the interviewees and the survey respondents. Details of respondents are given in 6.1 and it can be seen that none of the TelCo respondents are directly involved with knowledge management – all of them could be considered 'users'. Within LawCo, professional support lawyers (PSLs) are the hub of the knowledge sharing network and are aware of

much to do with knowledge sharing. Thus nearly 30% of LawCo respondents are directly concerned with (and knowledgeable about) KM and KS. In EngCo, only around 10% of the respondents (the KM-related staff and one involved with the engineering intranet) could be expected to have some level of 'professional' experience of knowledge sharing.

This variation of respondents could affect the data as those involved with KM may well answer some of the questions based on a close appreciation of what actually happens in the organization whereas those uninvolved will be relying more on their perceptions. The makeup of the respondents is generally different to that of the interviewees; see Table 41 which shows the percentage of interviewees and survey respondents in KM- or KS-related jobs.

	Interviewees	**Survey Respondents**
TelCo	50%	0%
LawCo	17%	30%
EngCo	100%	10%

Table 41: Interviewees and Respondents involved with KS

One reason why these different groups have differing views may be to do with their varied understanding of the nature of knowledge. As has been seen in the interviews, most of those involved professionally with knowledge management have an understanding of the differing concepts of data, information and knowledge. Those not involved are perhaps less likely to have thought about these distinctions and, as a result, some respondents may be confusing knowledge sharing with information sharing. This could explain some of the discrepancies in responses as some of the organizations are better at *information* sharing than *knowledge* sharing.

With the benefit of hindsight, more care should have been taken to try and match the type of respondents to the survey with the type of interviewees. Those involved professionally with KM are likely to have very different perceptions of things to do with knowledge sharing than 'users'.

This chapter has examined the data from the research survey, interpreting the responses from each of the three responding organizations and across the organizations. It has considered and categorised the job descriptions of the respondents and discussed the survey information provided by ProfCo from their own internal survey.

Finally, it has discussed the differences in views that have become apparent between the survey and the interview data.

The next chapter will discuss and reflect upon the results of this research.

7 DISCUSSION

This chapter first discusses those areas of the research arising from the research framework – strategy, structure, people, process and technology. Next are discussed the linkages between them and other areas which arose from the interviews; the nature of knowledge and evaluation in KM. Finally, alignment and its relationship to knowledge sharing is considered and an approach to internal fit for knowledge sharing is proposed.

7.1 STRATEGY, PEOPLE, PROCESS, TECHNOLOGY AND STRUCTURE

7.1.1 STRATEGY

This section discusses the organizations' strategic approach to knowledge sharing – particularly in terms of senior management support - as well as the specifics of a *knowledge strategy*.

As discussed in the literature review, there is a significant amount of research suggesting that without the commitment of top management, KM initiatives (or indeed any change programme) are likely to fail. (Holsapple & Joshi, 2000, 2002; Kotter, 1995; Massey et al., 2002). Alazmi and Zairi's (2003) survey of

knowledge management critical success factors found sharing and technology infrastructure to be the most oft quoted. However, the next most quoted after those were top management support and a knowledge strategy. Massingham (2004) commented on the importance of a knowledge strategy to focus knowledge on creating customer value and Damodaran and Olphert (2000) emphasised that managers should '*walk their talk*'. Subsequent research has gone on to emphasise the importance of getting "*management buy-in to KM through education and understanding of the benefits to individuals and the organization.*" (Loye, 2008, p.166). Although the survey responses indicated some agreement with the view that senior management supported knowledge sharing, almost all the interviewees had the opposite view. As discussed in 6.3, this suggests that senior management are quite adept at '*talking the talk*' but less so at '*walking the walk'*. Overall, four of the five organizations had little concrete senior management support for knowledge sharing. If senior management considered knowledge sharing at all, it was mostly as something to improve efficiency. This lack of interest is perceived by middle management and thus knowledge sharing does not become one of their prime drivers. As Holsapple says "*In today's knowledge-based economy a successful leader will be one who can effectively manage both organizational knowledge resources and associated knowledge manipulation skills. He or she creates conditions that allow participants to readily exercise and cultivate their knowledge manipulation skills, to contribute their own individual knowledge resources to the organization's pool of participant knowledge*" (Holsapple & Joshi, 2002, p.59). This is not happening in these four organizations and this constrains knowledge sharing. A study described by Hiebeler (1996) suggested that one crucial reason for poor KM performance was a "*lack of commitment of top leadership to sharing organizational knowledge*".

The interviewees did not offer any insights into why there was this lack of senior management interest. Perhaps it is simply that top managers have many other areas clamouring for their attention and knowledge sharing has not yet reached the top of their agenda. Perhaps they have not made the connection between knowledge sharing and motivation. Certainly the situation in EngCo where knowledge sharing was defined as the responsibility of the process owner

suggests an assumption on the part of senior management that all they have to do is delegate and it will happen. Why there is this lack of management interest is an area for future research. Perhaps, for example, it is related to the flip side of core capabilities – core rigidities (Leonard-Barton, 1992) which can affect all areas of organizational change.

Top management support and a strategy are not, of course, the same thing but they do seem intimately connected. While it is not impossible to have a strategy in place without such support, it is unlikely to be well promulgated and enforced if the top management are uninterested. In both EngCo and LawCo, those responsible for knowledge management (who were at a middle management level) felt that **they** had a strategy but they could not impose it due to the lack of more senior support - "*As far as I'm concerned, we have a strategy but because we don't have a CKO or anything then I would recognise that someone else in the organization might pop up and say 'this is the knowledge management strategy for this part of the business'. so, for me, the strategy is global but I haven't got the authority to impose it across the organization*." (EngCo-Int19).

Only one of the organizations, ProfCo, had a top-level strategy for knowledge (which it called its *knowledge proposition*) and this was also the only organization with good top-level management support for knowledge sharing. It can be argued that the nature of the business of ProfCo could instil a deeper understanding of the values of knowledge sharing into senior management – after all, without the knowledge of their people, they have nothing at all. However, the same is true of LawCo but a similar level of management support was lacking. (It is worth noting however that some time after this research in LawCo was completed, a head of KM was appointed at partner level and a KS strategy is now in place.) The lack of a strategy for knowledge sharing in the other organizations is not the direct causal result of this lack of senior management support but their lack of interest is likely to lower the priority of the development of any such strategy. In addition, middle management is unlikely to show any great support for knowledge sharing initiatives if they perceive a lack of interest from their senior managers.

7.1.2 PEOPLE

As will be discussed in the rest of this chapter, this lack of management focus seems to adversely affect other areas.

A number of interviewees commented that people were not specifically against sharing but equally, there was little to encourage them to share. Most interviewees felt that people were not recognised or rewarded for knowledge sharing and this view was shared by the survey respondents from EngCo and LawCo. (TelCo respondents disagreed with their interviewees and this is discussed in section 6.4.) This will have a negative effect on motivation. Similarly, people are not measured in any way against sharing knowledge so they do not focus on it. They tend to be rewarded for expertise rather than for sharing that expertise. Many felt that this sometimes promoted a feeling of 'knowledge is power' as it is rewarding the possession of knowledge rather than sharing that knowledge (Chan & Garrick, 2003) thus creating a 'knowledge fortress' (Scarbrough, 2003). On the other hand, ProfCo – where strategy focussed on driving behaviours – showed survey results where around 70% of the respondents felt that they *were* recognised and rewarded for sharing knowledge. Motivation was discussed in the literature review and Osterloh and Frey (2000) discussed the need for both intrinsic and extrinsic motivation and this seems to be supported by the comments in the data suggesting that recognition is at least as important as reward for encouraging knowledge sharing. KS will be encouraged if people are valued for doing it rather than just for possessing knowledge and thus motivation to share is important whether it be by recognition or reward. Unfortunately, such recognition and reward was not widespread in most of the organizations researched. This recognition and reward is ultimately in the hands of senior management. If they do not perceive a need to motivate knowledge sharing then it is unlikely to take place in an optimal fashion.

Those organizations where employees were subject to a strong discipline of filling in time sheets and thus accounting for nearly every moment of their working day were in danger of being even less motivated to share knowledge.

Sharing takes time and if this is perceived as a '2nd class' usage of time, as was suggested by a number of interviewees, it will be less likely to happen - "*Everybody knows about the precedent index but that's non-chargeable time that they would have to spend converting that knowledge into something they could actually share and whereas they all know they have got to get their non-chargeable time down - as much as it says it's important...*" (LawCo-Int9). This was noticeable particularly in the professional services firms such as ProfCo and LawCo where there is a very strong focus on charging client billable time. This links back to earlier comments about senior management support. Although the senior management might extol the virtues of knowledge sharing, it was obvious to many of their employees that it was not as important as short term billing targets. This is not an insurmountable problem as it is noticeable that the one organization that focussed on embedding the right behaviours to promote knowledge sharing (ProfCo) showed very high levels of encouragement to share and recognition for sharing in its own internal survey despite being driven by bookable time although even here some interviewees highlighted the problem – "*there is a huge focus on time and utilisation and time being spent with clients as opposed to other things and I think this is a disincentive for spending the time to sort of share*" (ProfCo-Int17).

Two major constraints on knowledge sharing are thus a lack of motivation to share and a focus on booking time to 'more important' things. Both of these reflect back on the approach of senior management to recognition and reward and to espoused priorities.

Also evident were differing views on knowledge management and knowledge sharing from different groups. For simplicity, three groups can be considered – senior management, KM groups and 'users' of data, information or knowledge. Each have their own agendas and perceptions. Senior management have mostly heard about knowledge management but, as with other specialised areas, probably have little detailed knowledge of it. They have heard it is important and mostly seem to see it as something to improve efficiency. Few seem to have thought in depth about the details of making it happen. For the KM group, knowledge management is the raison d'être for their existence. They will

probably have a good knowledge of tools and techniques for KM and some will have an appreciation of the complexity of embedding it in an organization. They will be constrained, however, by often working from a middle level of the organization in many directions – for example, persuading senior management to back their ideas and users to buy into them. Users, on the other hand, are likely to be concerned with many things that they consider more important than sharing knowledge. The next project they have to deliver and the specific things on which they are measured, for example. They will use tools and techniques that *they* feel make their life easier.

These differing views are neither right nor wrong. They merely reflect the different world views of the various groups. Reconciling these different worldviews does not necessarily require that a consensus be achieved. Following Checkland (1990), a consensus is a special case and what is needed is for the actors in an organization to reach an accommodation concerning what constitutes a knowledge management system, i.e. a KM system that the involved parties are prepared to go along with (p.30). This accommodation needs to be built on a shared understanding of what constitutes meaningful KM activity. Checkland and Scholes (1990) argues that change (such as a knowledge management or knowledge sharing programme) should be systemically desirable (e.g., the purpose and benefit of implementing KM is discussed and some accommodation reached) but change must be culturally feasible. Cultural analysis in Checkland's formulation of the soft systems methodology comprises analyses of social system and political system. Social system analysis considers roles, values, and norms. A role might be institutionally defined - senior management, KM manager - or emergent (e.g., KM expert or KM champion). A role has expected behaviours (norms) and performance in the role is judged according to local values. For Checkland, politics is concerned with power and the maintenance of order; political analysis investigates how power is expressed in a situation – how is a commodity such as knowledge obtained, used, preserved, and passed on, and through what mechanisms (p.51). Knowledge management is, therefore, a delicate mix of purposeful activity (including the sharing of knowledge) and cultural change. The cases suggest that the processes

to reach an accommodation on what constitutes meaningful knowledge management in a given organizational context are weak. The case organizations' ability to address the cultural dimension of knowledge management are even weaker.

7.1.3 PROCESSES

Most interviewees agreed that few organizations had processes explicitly *for* knowledge sharing. However, as suggested by Maier and Remus (2003), there exist processes that may *affect* knowledge sharing and section 6.4 argues that this accounts for the survey respondents' agreement with the view that processes *are* in place. These supporting processes may be deliberate, where knowledge sharing processes are embedded in business processes although, to be effective, this probably requires more than the approach of EngCo where "*there is [a process] that covers really the ownership of all processes and within that it says - there is a statement that says 'knowledge management is the responsibility of the people who own the processes*'" (EngCo-Int19). Alternatively, it may happen more by chance where, for instance, some processes, by their nature, encourage people to get together and discuss things as part of the process and this appears to be what most of the interviewees were referring to. Similarly, some of the companies focus their IT onto improving processes and this can often drive technologies in directions that encourage at least information sharing and sometimes knowledge sharing.

Not mentioned by any interviewees were specific knowledge meta-processes – processes to help the organization develop a knowledge strategy or to ensure that knowledge aspects are embedded in business processes. This is perhaps due to the fact that most of the KM and KS initiatives in these organizations are driven from a middle management level that does not have the 'clout' to instigate or change processes at this higher level. If these initiatives were supported at a higher level or perhaps driven by a knowledge strategy then there would be more likelihood of integration with business practices.

Some firms mentioned processes for collecting knowledge either in the form of 'lessons learnt' or in an effort to retain knowledge when an employee was

leaving. Despite this collection of knowledge, there seemed little in place to actually encourage its re-use – most interviewees agreed that even when such knowledge was collected, the dissemination of it was much more problematic. In addition, some organizations, like EngCo, appear to have the rather overly-formalised process approach mentioned by Disterer (2001) which can be detrimental to sharing. Indeed, when processes did exist, they tended to be towards the well structured end of the spectrum mentioned by Allweyer (1999) as not being ideal for supporting knowledge sharing: "*We have quite a rigorous process for capturing expertise and codifying it - particular knowledge that is at risk all that is held within one of two experts who might be retiring or something*" (EngCo-Int19). Allweyer suggests (See Table 3 in section 2.4) that knowledge processes have low predictability and benefitted from being weakly structured. What processes existed in the organizations studied tended to be workflow based, deterministic and well-structured. This would imply that a less structured approach could bring benefits. However, this comment - "*I think there are other places where we do encourage sharing of things but it only works well when there's a written-down spec of - you have to do it and you have to get the tick in the box because otherwise it is not seen as a core part of someone's job to share*" (ProfCo-Int16) raises the dichotomy that if it isn't an ordered, specified process, then it may not be followed. Once again, this could probably be overcome by motivation causing an inherent desire to share in which case less structured processes would be more likely to be followed.

Some of the organizations used training which involved encouraging sharing alongside learning; however, the complex relationship between knowledge management and learning has not been considered in this research.

Processes can thus be enablers of knowledge sharing when they encourage relevant interaction or communications. However, in general, this happens by chance rather than by design in the organizations researched.

7.1.4 TECHNOLOGY

While technology was sometimes guided by process, as discussed in the previous section, some research suggests that it is more beneficial to focus technology on

KM initiatives rather than on processes (Saito, Umemoto, & Ikeda, 2007) and there are some signs of this happening, for example the lessons learnt approach in PubCo, knowledge capture in EngCo and the precedent index in LawCo.

In all the organizations, the data showed there to be more focus in IS areas on information retrieval than on knowledge sharing. This is not to denigrate the importance of managing data and information as this is a necessary precursor to knowledge management and a valuable adjunct to knowledge sharing. Indeed Hislop (2002) argues that it is debatable whether information technology can support knowledge sharing at all as, in his view, all knowledge is made up of both tacit and explicit parts. As such, the information technology will only help to transfer the explicit part and without its tacit content, the full meaning of the knowledge will not be transferred. (It is, after all, called *information* technology, not *knowledge* technology!) Accepting that knowledge is a 'justified true belief' and thus requires people, this argument seems justified and it can be argued that, under this definition, *explicit knowledge* is really information.

Even if IS cannot store knowledge, it can help people to share both by providing them with information to synthesise into knowledge and by putting people into contact with one another thus enabling them to share directly. Nonaka and Konno's (1998) concept of 'Ba' and their spiral of knowledge creation envisaged information technology as contributing primarily to *Cyber Ba* - capturing and disseminating explicit knowledge (and information). Three of the organizations researched (EngCo, TelCo and ProfCo) showed a growing interest in the use of *discussion forum*-type technology - often as part of communities of practice - to enable and encourage communication. This would suggest that technology can also contribute to *Interacting Ba* which used to rely on physical proximity to encourage the sharing of tacit knowledge.

Referring back to the literature review, McDermott (1999), discussing communities of practice, emphasises not only the need for technology but also the need for management to create a culture and environment that encourages knowledge sharing. Similarly, Brazelton and Gorry concisely sum up CoPs saying,

> *"… create the conditions for a knowledge-sharing community to emerge. Implement some collaborative technology for the Internet. Organize some face-to-face meetings among potential participants. Encourage volunteer stewardship of knowledge by these enthusiasts. And create as many opportunities as possible for others to learn about the emerging community." (Brazelton & Gorry, 2003, p.25)*

It is with the first sentence of this quote that most of the researched organizations are found wanting. There is not the management drive to '*create the conditions for a knowledge-sharing community to emerge*'.

Two other points arose concerning technology which could be valuable areas of practitioner focus. First, any repository of information, to be useful, requires some means of retrieving that information and there were many comments from interviewees about the difficulty of finding information due to poor or non-existent search facilities. Some complained that even if one knew a document existed, it was hard to find – "*I often find it's impossible to find things. Even when you know something is there - you can't find it. God help me if I didn't even know it was there and was trying to find it*" (LawCo-Int9) while others commented on the reluctance of users to give poor applications a second chance – "'*I can't find it' - well - I tried once, three months ago, and couldn't find it, therefore I am not going to try again*" (ProfCo-Int14). Second, there were also a number of comments about information systems that were produced with no reference to users and thus did not meet their needs. End-user involvement is vital because "*it helps to ensure accurate requirements specifications, to facilitate the development of relevant application designs, and to foster a greater sense of empowerment and ownership among users of IS services*" (Rondeau, Ragu-Nathan, & Vonderembse, 2006).

Technology is undoubtedly a **possible** enabler of knowledge sharing in terms of its abilities to promulgate data and information and to promote communications between people. However, technology that functions poorly or is hard to use can quickly become an inhibitor. In addition, communities of practice are seen by many as an enabler of knowledge sharing but they require the management drive to embed the behaviours to make them work.

7.1.5 STRUCTURE

The structure of most large organizations which emphasises the inward focus of divisions does not encourage sharing (O'Dell & Jackson Grayson, 1998) and interviewees all agreed that sharing across groups in a large organization was generally poor – "*the organization is probably driven by a great many things but I wouldn't say that knowledge management was high on the list*" (LawCo-Int7). Some felt that it did not matter too much but others gave examples of where poor sharing was detrimental to the organization – "*We've basically got three lines of service and they go off and do different things and reinvent wheels*" (ProfCo-Int16). Flexibility of structure can be advantageous to sharing (Gold et al., 2001) but no thought appears to have been given to this in any of the organization. If most sharing takes place through people talking to each other (either face-to-face or computer-mediated) then enabling such contact is vital. Face-to-face contact will be easiest within a group or departmental setting so in the wider, large company area, the right technology will be necessary to facilitate or enable sharing.

A number of points arose from the data which suggest how these structural problems might be overcome. First there was the use of matrix management; one company pointed to the advantage of having 'skill owners' running across functional business units. Another approach is the use of 'share fairs' where times and places are found for groups or departments to 'advertise' their expertise to other parts of the organization.

Another interviewee commented that "*it is not the organization that causes the problem, it is the storage of the knowledge or the information that causes the problem.*" (EngCo-Int23). This implies that the problems of structure may be overcome if information (or knowledge) are easily available right across the organization and one often successful way of doing this appears to be the use of the previously mentioned communities of practice.

Overall, discussions on structure seemed to suggest no particular solutions to structural problems, indeed all of the companies seemed to take it as a given that sharing knowledge across a large organization was a problematic and the general focus was to work around the problems caused **by** structure.

7.1.6 LINKAGES

Few indications of linkage between the elements of the model were seen in the data. In those organization without any overall strategy for knowledge, there was some sign of linkage between technology and process. This is almost certainly due to the tendency of many organizations to focus on business processes over the last decade or so (e.g. Davenport, 1993; Johansson et al., 1993) and to use technology to enhance or automate them. Similarly processes can encourage people to share simply by ritualising communication. The one organization with a knowledge strategy in place linked people's behaviours closely to strategy in an effort to embed the required behaviours in the organization.

This lack of linkages raises the question as to whether they are genuinely lacking or is this a shortcoming in the research methodology. Perhaps the wrong people were asked or perhaps the questions used did not elicit the right information.

7.1.7 ATTRIBUTES OF KNOWLEDGE

The concepts of data, information and knowledge were understood by nearly all those involved with KM but still caused confusion, particularly where technology was concerned. This confusion is not new:

> *'There is also common agreement that "data", "information" and "knowledge" are not the same, even though they are often – wrongly so – used interchangeably. Their differences are often as unclear to the experts as to the layperson.' (Mitroff & Linstone, 1993, p.20)*

It is thus not surprising that non-academic users get confused and it is clear from the interviewees that all these arguments are unhelpful from the point of view of knowledge workers. "*They don't relate to a lot of the theoretical things around knowledge management ... they don't want to know, they don't really care - they know what sort of stuff they want, they know when they want some in depth stuff, they know when they want some high-level, fluffy stuff to go and talk to clients about*" (ProfCo-Int16). In summary, they want 'stuff' to help them do their jobs and have little or no interest in philosophical discussions as to what sort of 'stuff' it is. Indeed, trying to promulgate an understanding of these theoretical differences is likely to be counter-productive.

The knowledge perspective of each organization was discussed in Chapter 4 and the results were summarised in Table 26 which is repeated here for convenience.

Company	Approach	Strategy	Organization	KM instruments & systems	Economics
T = Primarily Technological Orientation; B = 'Bridging the Gap' (In no case was there a primarily human-oriented approach.)					
TelCo	T	T ⇨ B	T	T ⇨ B	T
LawCo	B	B	B	B	T
ProfCo	B	B	B	B	T ⇨ B
PubCo	T	T	T	T ⇨ B	-
EngCo	⇨ B	T	T ⇨ B	T ⇨ B	-

Table 42: Knowledge Perspectives

It can be seen that only ProfCo and LawCo are actively bridging the gap. PubCo is very technology-oriented followed by TelCo and EngCo both of which are moving towards bridging the gap in some areas. What causes these differences? EngCo and TelCo are technically competent and technology-driven companies which could account for their technology focus in knowledge sharing. In the cases of ProfCo and LawCo, both are firms largely dependent on the knowledge of their employees. Employee knowledge does matter to the others, but perhaps it is perceived as less important as major portions of their income arise from different areas such as manufacturing, infrastructure services or data management. Perhaps greater dependence on employee knowledge (as in ProfCo and LawCo) is necessary to focus the corporate mind on the importance of the 'people' side of knowledge sharing.

7.1.8 MEASUREMENT

The lack of literature on evaluation in knowledge management was discussed in the literature review and this appears to be matched by the lack of any attempts to evaluate KM in practice. As Kalling (2003) found, the data shows more focus on whether sharing was taking place rather than on whether this sharing produced any benefit for the organization. The only indicators mentioned were general performance improvements that could not really be directly tied to

knowledge management or sharing. In some cases, figures were recorded for such things as database lookups but no constructive use of these results was evident. Only by one interviewee was a balanced scorecard approach mentioned (Sveiby, 2002) and this appeared to be in use in only a small part of the organization. No thought appeared to be given to areas such as intellectual capital (Bontis, 1998) or success factors (Maier, 2002). Perhaps a way forward would be the use of success factors – the DeLone and McLean model expanded for KM (Maier, 2002) (Figure 13) involves a number of areas which were mentioned by the interviewees.

Interviewees did not seem particularly worried about this lack of measurement and seemed to take a view that could be summarised as implying that as measuring intangibles was difficult, it was all right not to bother to try.

The above discussions are summarised in Table 43:

Strategy	There was a widespread view that senior management support in promoting KS was vital but … ...the seriousness of top-level management buy-in was suspect. Most senior managers would talk about the importance of knowledge sharing but… ...few did anything practical to support or encourage it. Only one of the organizations had a top level KM or KS strategy and although the lack of a strategy for knowledge sharing in the other organizations is not the direct causal result of the lack of senior management support, their lack of interest is likely to lower the priority of the development of any such strategy and to dissuade lower levels of management from proactively pursuing KS initiatives.
People, Skills and Behaviours	There is little to motivate people to share knowledge... There is a lack of time due to pressure of 'billable' work. There is a lack of measurement. Reward systems emphasise expertise over sharing. Peer acclaim may motivate people to share more than financial reward. Only one organization was working through HR and training to embed knowledge sharing behaviours. In the others, skills and behaviours for KS were not well understood or indeed considered. These problems reflect back on the lack of interest of senior management.

Processes	No high level business processes focussed specifically on KS No knowledge meta-processes to help embed knowledge aspects in business processes Processes in general often help KS by encouraging workflow and interaction. Some training processes encourage KS. Processes can enable KS by encouraging interaction, but this seems more accidental than directed in the organizations studied.
Technology	Technology tools must be designed with users in mind. To be accepted, tools must make the user's life easier. Tools must be launched with adequate preparation and training. First class search facilities are vital - repositories are of little use if the user cannot find content. Discussion forums can encourage interaction and hence sharing. Technology can be a great enabler of KS provided it meets the users' needs.
Structure	Sharing across large organizations is hard. Departments become 'silos' of knowledge. Easy availability of information organization-wide can ease structural problems
Linkages	There were few indications of linkages other than between technology and process except in the one organization with a knowledge strategy where that strategy was to embed the required behaviours.
Attributes of Knowledge	Users want 'stuff' and do not care whether it is data, information or knowledge. Trying to explain the difference is generally considered counter-productive. Knowledge perspectives varied. Those firms heavily dependent on the knowledge of their employees showed more tendency to consider both sides of the equation – human and technology. The technology-driven companies were more technology biased in their approach to knowledge.
Evaluation	There were no serious signs of evaluation nor any great desire to try. This seems to be due to the recognised difficulty of evaluating intangible benefits.

Table 43: Summary Conclusions

7.2 ALIGNMENT

The literature review on alignment discussed both external and internal fit. In terms of external fit, where the knowledge sharing 'strategies, systems and management practices' (Miles & Snow, 1984, p.11) should fit the way the firm currently works, there is little evidence of this happening in the data due to the lack of any such knowledge sharing strategies. Only one firm, ProfCo, had a strategy of building knowledge sharing to help improve the functioning of the

organization and there is thus not enough data in this research to form any conclusions about external fit.

Internal fit (Leavitt, 1965; Woodward, 1965) considers how well the areas such as strategy, structure, people, process and technology complement one another. Internal fit can thus be considered in the same light as the linkages of the research model discussed earlier. The data does show some evidence of these areas supporting one another but, once again, it appears mainly by chance rather than by design. As discussed earlier, it cannot be said that a lack of strategy and of management support *causes* a lack of internal fit. However, these lacks could certainly reduce any drives to align the different areas. This finding does, however, prompt a possible approach to strategic fit.

The conventional approach to alignment and strategic fit is one driven by strategy then structure as shown in Figure 38. (Sauer & Yetton, 1997).

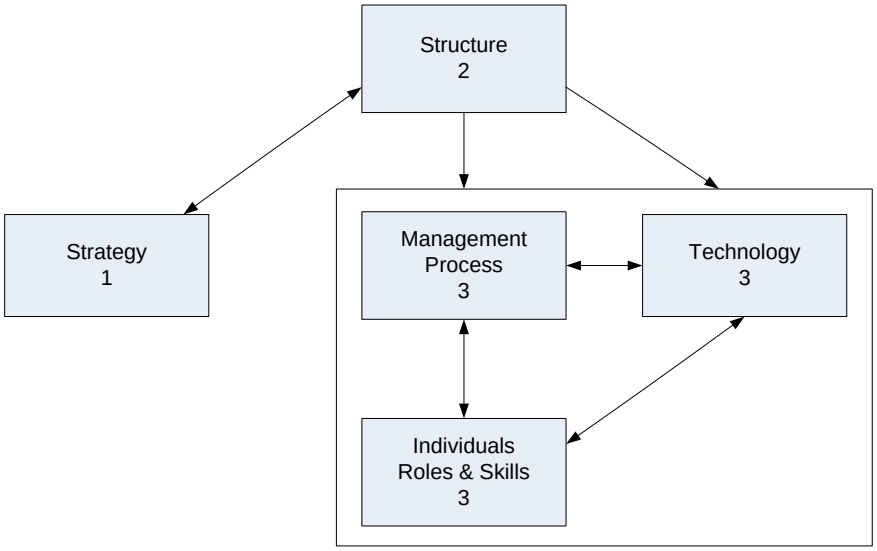

Figure 38: Conventional Approach to Alignment
(Sauer & Yetton, 1997, p.36)

However other approaches are possible. Yetton et al. (1994) give an example from a firm of architects who started with new technology, taught themselves to use it, put in place relevant management structures and processes and all of this both drove and supported their strategy. See Figure 39.

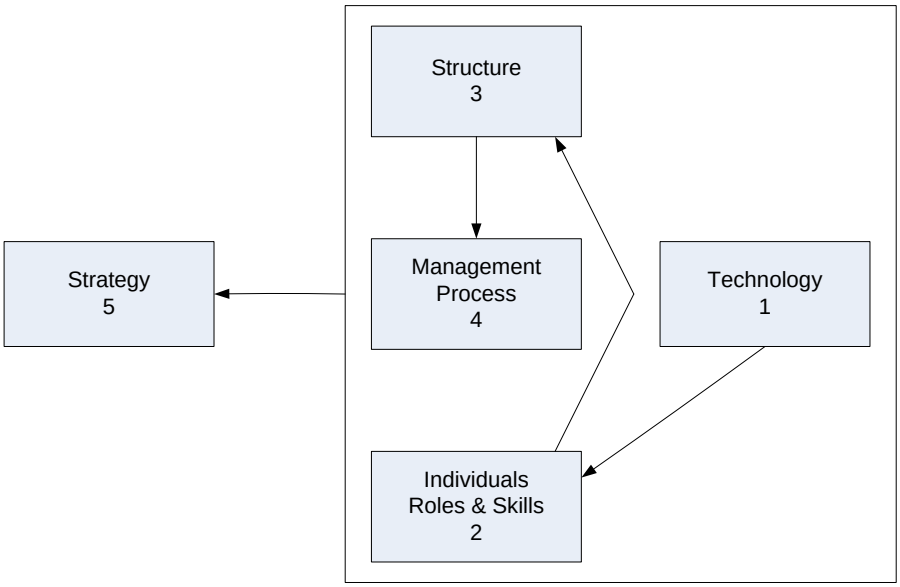

Figure 39: An Alternative Alignment Approach
(Yetton et al., 1994, p.63)

It seems clear from the earlier discussion that in the knowledge sharing domain, some sort of top management led strategic approach is a necessary starting point. This need not be a traditional, formal, written strategy document but it does entail board level support and buy-in and an agreed understanding or vision of how knowledge sharing should be made to work across the organization. Recent literature supports the importance of managerial buy-in (e.g. Sveiby, 2007) and emphasises that management should proactively encourage knowledge sharing (e.g. Marks et al., 2008).

Discussions earlier in this chapter have emphasised the importance of behaviours and motivation in encouraging knowledge sharing so the strategy should focus on this area first. Providing tools for knowledge sharing will be largely ineffective if no one wants to share.

This focus on behaviours should endeavour to embed the idea that sharing is good for the company as well as for the individual (Ardichvili et al., 2003; Reimus, 1996). The individual needs to be motivated to share knowledge by reward and/or recognition (Osterloh & Frey, 2000). Using time for knowledge sharing activities also needs to be seen to be acceptable.

As behaviours are changed, technology can be put in place to facilitate knowledge sharing either directly or alongside processes. As a result, this research suggests that the approach to alignment of knowledge sharing should be as shown in Figure 40.

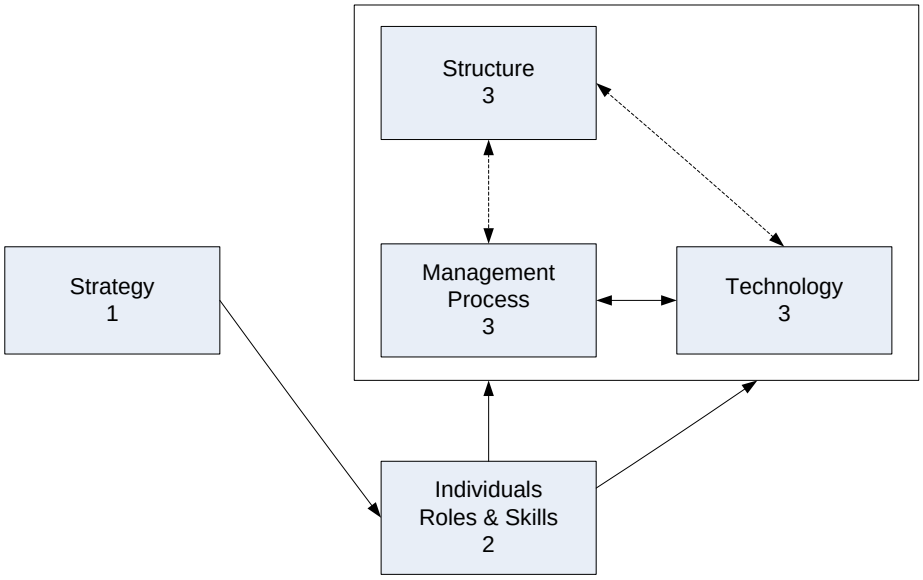

Figure 40: An Alignment Approach for KS

In Figure 40, structure is shown linked by dashed lines. It is not clear from the data that any specific changes to large company structures would have a significant effect on knowledge sharing. As one interviewee put it, "*I guess whichever way you cut it, if you cut it in another direction you'd have difficulty knowledge sharing in the orthogonal direction*" (PubCo-Int10). There is probably more to be gained by using technology and processes to work around any constraints caused by structure.

As with IS alignment, this approach may not be relevant to all organizations. If, for example, an organization has achieved a highly developed culture of sharing without any formal strategy in place then the strategy may be unnecessary. However, this research does suggest that this approach to alignment could be relevant in medium to larger organizations.

7.3 SUMMARY

This chapter has discussed and reflected upon a number of areas arising from the research. In the case of the research model, it has suggested the primacy of senior management support as an enabler of knowledge sharing. The contribution of other parts of the model as constraints or enablers has also been discussed as has the knowledge perspectives of the organizations. The subject of alignment has been considered, particularly in relation to internal strategic fit and an approach proposed that could improve alignment for knowledge sharing.

The next chapter will present the conclusions in detail.

8 CONCLUSIONS

The chapter that follows builds on the foregoing discussions to present the contribution to research and the implications for practice. Thoughts on the research design, limitations of the research and possible directions for future research follow and lastly, the PhD process itself are then discussed.

8.1 CONTRIBUTIONS

Contributions are apparent in three main areas. Enablers and constraints on knowledge sharing; approaches to knowledge sharing and the use of alignment.

Constraints and enablers are frequently two sides of the same coin – the lack of an enabler can result in a constraint. A lack of senior management support, in deed as well as in word, has been shown to be a significant constraint on knowledge sharing which effects a number of other areas particularly motivation. Motivation can be a major enabler of knowledge sharing (as it can be of most things) but the recognition and reward which could motivate knowledge sharing needs to be driven by senior management.

Business processes can be enablers of knowledge sharing when they encourage interaction and communication – even when the processes are not focused specifically on knowledge sharing. Specific knowledge sharing processes such as 'lessons learnt' or 'after action reviews' can be even more positive provided the processes are not so rigid that they stifle any necessary flexibility.

Technology also has great potential as an enabler of knowledge sharing, provided it works. Technology that is poorly designed and does not meet the users' needs can equally well constrain knowledge sharing. One of the most oft cited of such problems was poor search facilities leading to an inability to find what was required.

Organizational structure was not perceived in quite the same way. Although the structure of most large organizations was felt to be something that did not help knowledge sharing, the view seemed to be that this could not be changed but it could be worked around. Partly by technology, but also by instilling an inherent desire to share into the workforce.

Three other constraints on knowledge sharing were found. First was the lack of any serious attempts at measurement. The old adage 'you get what you measure' suggests that this lack of measurement will be a constraint on motivation to share. However, as the literature review has shown, evaluation in knowledge management is not easily undertaken and there is a need for simple and effective approaches to measurement to be developed. Next is the concept of data, information and knowledge beloved of academics and KM professionals. Dissemination of this idea to 'users' was seen as unhelpful to knowledge sharing. The users want what they want and esoteric (from their point of view) discussion on whether it is information or knowledge is not perceived as useful. Finally, there is the situation where booking time to a client is considered as the highest priority by a large margin. These time sheet fixated organizations need to promote 'KS time' to being seen as a primary use of time rather than coming a poor second to client billable time. Further research is required to understand just how much this constrains knowledge sharing and how it can be mitigated.

Analysis of the approach to knowledge management showed that only LawCo and ProfCo were currently utilising both human- and technological-oriented approaches to try and 'bridge the gap'. Both are professional service firms and almost their sole asset is the knowledge of their staff. EngCo and TelCo are driven by technology and this is reflected in their approach to KM and KS. The use of technology in organizations in general is widespread and as a result the existence of databases and repositories that might help information and knowledge sharing is also commonplace. However, perhaps the focus on employee knowledge in some organizations helps focus the management mind such that a more balanced approach to knowledge sharing results. This could be confirmed by further research to relate the style of KM to the type of organization and if a meaningful relationship is confirmed then specific types of organization would have an indication of where to focus their efforts.

The discussion on alignment as internal fit built on the findings concerning the pre-eminence of senior management support. Effective sharing requires people to be motivated to share and this is more likely to happen with proactive management support and a strategy – formal or informal – that supports knowledge sharing through behaviours, processes and technology. An approach to strategic fit is thus proposed where strategy drives behaviours from which processes and technology subsequently flow.

8.2 Implications for Practice

In terms of practice, it has long been recognised that many things contribute to knowledge sharing; however the order in which these things need to be considered has not previously been clarified. An understanding of the primary necessity for senior management support and direction before knowledge sharing can really deliver organization-wide benefits can be useful to organizations.

In terms of overall approach to knowledge management, it is valuable to promote the idea that Hansen's (1999) codification/personalisation 80/20 'rule'

– which is still prevalent in management circles – should be updated to take account of the newer research suggesting that a 'bridging the gap' approach is more beneficial.

While all the constraints and enablers mentioned earlier will have practical ramifications, there are some that are easier to highlight and act upon. First, a shift of emphasis in technology from just *storing* information and knowledge to *finding* it again would be helpful. Too many respondents commented on the problem of finding information – in some cases, even when they knew it was there. Next is the problem of employees focusing on client bookable time to the detriment of all else. Although one or two organizations were aware that this was a potential problem, the approaches of senior management to mitigate the problem were not considered in such a positive light by those further down the organization. Last, KM groups should not try to engage users in discussions about data, information and knowledge. It is clear that this causes confusion and adds no value. Similarly, it appears to be of no concern to users whether what their computer system stores is *information* or *knowledge*. As one interviewee said, what they want is 'stuff' that helps them do their job. These concepts are thus of some use to the KM practitioner where they can help in planning knowledge sharing systems and the use of technology, but most agreed that the distinctions should not be promulgated to users.

8.3 THOUGHTS ON RESEARCH DESIGN

The research design was based on an interpretive approach using a questionnaire backed up by multiple case-studies using semi structured interviews. Some technology was utilised to aid data analysis. All interviews were recorded using a digital voice recorder. Voice recognition software (ViaVoice) was used to aid transcription and NVivo was used to aid the qualitative analysis. Most of the research process went well but some areas raise questions which are discussed in the rest of this section.

Unlike more experimental methods, interpretive methods tend to involve less control. Having achieved access to an organization, there was rather too much chance involved in the resulting choice of interviewees despite specifying the type of interviewees required. As discussed in the research design, interviewees were requested who were responsible for KS, involved with delivering KS, and sharing knowledge in their day to day work – in none of the organizations was this mix achieved. This variation in interviewees affected the breadth of views across an organization; a narrow range of knowledge management specialists possibly giving a different overview to that from a wider cross-section of the community. In addition, some interviewees were helpful, some less so and some raised interesting points which deserved investigation but it was usually not possible to revisit earlier interviewees with new questions.

Multiple case-studies are inherently shallower than a single case study, with a less rich picture of the organization achieved. It could be argued that a single longitudinal case study with the necessary extra access might have provided more useful data but, as can be seen from the data, this would have depended on choosing the right organization which would have been hard without the benefit of hindsight. Perhaps a follow-up single case study could provide more useful data.

All the interviews – both face-to-face and telephone – were recorded. This allows the interviewer to pay more attention to the answers being given than if they were having to note it all down verbatim. A digital recorder was used which has significant advantages over the older tape-based recorders:

- They record for very long periods of time so there is no requirement to remember to change tapes periodically which can upset the flow of the interview.
- Battery life is much longer than for tape recorders.
- The resultant sound file can be transferred almost instantly to a computer where it can be manipulated if necessary to reduce background noise or to

otherwise increase sound quality. This was particularly relevant for the telephone interviews which are inevitably of relatively poor quality.

The use of a semi-structured interview has the advantage of allowing interviewees to focus on topics they consider important. However the areas raised or discussed are likely to change from one interview to the next and thus it is important to recognise that the balance and emphasis of such issues can be affected by the order of the interviews. A more structured interview could produce more consistent results at the expense of richness of data. Similarly, a totally unstructured interview could have allowed interviewees to bring up other topics but equally could lead to too many themes in the data for any meaningful analysis.

ViaVoice helped to speed up the transcription of the data. The process involves the researcher listening to the playback of the interview and simultaneously dictating it to ViaVoice. ViaVoice is first trained to the user's voice and then its specialist vocabulary can be increased by letting it analyse relevant documents. All of this allows for fairly fast dictation, but there are inevitable transcription errors. The researcher found that the most effective approach was to watch the words appear as dictation progressed and to correct errors as they become visible. Although this slows the process somewhat, it gives good accuracy although doubtless some errors remain. After transcription, the source documents were re-read and any peculiarities of meaning checked back against the sound files. Transcription by the researcher has the advantage over an unrelated transcription typist in that the researcher was there and thus should have a better memory of the interview. On the other hand, the closeness of the researcher to the data means they must be careful not to add anything over and above the recorded words. This is particularly relevant when the recording is unclear and if clarity was still lacking after repeated listening, words were omitted rather than guessed.

NVivo is a complex software package offering many tools to help qualitative analysis, only a small sample of which was used in this research. The source documents were loaded into NVivo and as they are read, passages can be coded at 'nodes', identifying themes. The researcher can add notes at any point which can aid later analysis. The very powerful query facilities of NVivo can then be used to cut the data in almost any way - in this case, primarily by company and/or node.

8.4 LIMITATIONS OF THE RESEARCH

This research used an interpretive approach with a relatively small number of cases and interviewees. This means there will be limitations in the areas of generalisability, reliability and validity.

Although a statistical approach was not sought, it is important to stress that the sample is too small to provide any statistically representative data on knowledge sharing in organizations in general.

As with all interpretive research, the findings and conclusions are the result of interpretation by the researcher. As a result, the validity of any findings can be questioned. Other researchers may not interpret the data in the same way and replicating the data would be problematic - even given access to the same interviewees, they are unlikely to give exactly the same answers. In addition, the researcher may introduce bias, often subconsciously, by favouring data that supports any preconceived ideas and discarding data that is 'inconvenient' (Eisenhardt, 1989).

The validity of the findings can also be questioned as it is largely impossible to eliminate interview bias (Easterby-Smith et al., 1991). Interviewees will inevitably put their own slant on answers and may deliberately introduce bias to give a particular view of themselves, their colleagues or the organization. They may do this for personal or professional reasons and they can interact with the interviewer in many different ways. The interviewer may also unintentionally bias questions or answers.

The rationale for the choice of organizations was discussed in section 3.6. This thesis has suggested earlier that perhaps some basic knowledge sharing competencies are required before alignment can have any effect and so perhaps more useful results could perhaps have been obtained by utilising a pre-interview to ascertain the general level of knowledge sharing prevailing in the organization and then taking the interviews no further if a particularly disjointed approach was found.

The variable responses to the survey and the interviews have been covered in 6.4 and as was discussed there, more consistent results could perhaps have been achieved with better control of the choice of survey respondents. However a desire for consistency is not always the best approach and the variety of respondents did lead to unexpected findings.

The lack of evidence for any significant linkages between the parts of the research model has been discussed in 7.1.6 and may be genuine or may be due to shortcomings in the research methodology. Perhaps a higher level of competence at knowledge sharing *is* required for linkages (and alignment) to become apparent or perhaps the wrong questions were asked of the wrong people. Further research would be necessary to pursue this further.

8.5 FUTURE RESEARCH

There are four areas that could particularly benefit from future study:

Luftman (2003) has proposed a methodology and tool for assessing IT/business alignment and future research could usefully investigate the adaption of this for knowledge sharing. Luftman's approach was based on the Capability Maturity Model originally developed for software engineering but now widely applied to other areas. If this model was found to help develop knowledge sharing, then it could be of considerable practitioner value.

All the case organizations considered themselves knowledge intensive organizations. In nearly all of them, interviewees mentioned senior management extolling the virtues of knowledge sharing. Despite this, in four of the five organizations, that same senior management did nothing concrete to promote knowledge sharing. Is this because their KM/KS teams have never told them what they needed to do or is it just that these initiatives have never climbed high enough in their priorities? As senior management support is so important to the success of knowledge sharing, this should be explored further.

While many companies utilise some form of time booking for their employees, professional service firms seem to have a significant fixation with client billable time. As this tends to be detrimental to knowledge sharing it would seem useful to research the effects in more depth and look at possible solutions or compromises.

Other than the rather evident observation that knowledge sharing is easier in a small group than across a large organization, this thesis has not found any significant data on the effects of organizational structure on knowledge sharing or how that structure may interact with any other constraints or enablers. Perhaps a wider review of the literature on organizational structures could point to likely areas for future research which should include pursuing the idea that good communications can overcome the problems of structure.

8.6 THOUGHTS ON THE PHD PROCESS

A new PhD candidate may or may not have research experience but is unlikely to have undertaken such a major piece of high quality solo research. As such, the level and quality of initial training and support provided by the institution are extremely important to ensure the candidate can make progress. During the period of this thesis, this training process has been greatly improved with more

formal taught courses. However most of these improvements were too late to benefit this researcher. (Similarly, the concepts of a research navigation map (Jasimuddin, Connell, & Klein, 2005) to build a model of the field of interest would have been useful earlier in the research.) The MPhil to PhD transfer document is primarily a plan for the research and the transfer viva validates that plan.

As the candidate progresses and learns, it is inevitable that changes of direction will occur in many areas and the input of supervisors is important here to maintain focus. The author too will change as the work progresses. Writing style will develop and familiarity with the subject will grow, as will the author's confidence in all aspects of conducting research.

This thesis was undertaken on a part-time basis which, with the benefit of hindsight, is not to be recommended. The PhD process requires continual concentration which is very hard if trying to earn a living at the same time - even if that is also on a part-time basis. Two or three weeks away from the PhD mean that at least a week or so will be necessary to bring everything back to the forefront of the author's mind. In addition, there is the lack of informal support resulting from only rare visits to the university. Technology means that nearly all the material needed is available at the desktop but sharing knowledge with other PhD candidates and academics is missing.

The PhD can be viewed as

> *"a collaborative effort between PhD candidate, supervisors, mentors, fellow research students, the research community in the institution of study as well as a wider community of researchers who are present at conferences and other events, authors of previous works upon which the research builds, and the internal and external examiners." (Sims, 2007).*

However this collaboration is likely to be significantly more effective for a full-time, university-based student.

8.7 SUMMARY

This thesis has considered knowledge sharing in organizations.

For knowledge sharing to become endemic in an organization, people need to **want** to share knowledge - so they must be motivated (time, recognition, encouragement, reward) – and they need to be **enabled** to share (process, technology, structure) and strategic direction and senior management buy-in will be necessary for this to happen.

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Appendix 1 Survey Form

Knowledge Sharing Perceptions

This survey is being undertaken by Steve Goodwin from the University of Bath with the agreement and support of your company.
It is designed you collect **your** perceptions on knowledge sharing in **your** organization
and it shouldn't take more than about 5 minutes to complete.
Responses are anonymous - you cannot be personally identified.

If you are reading the paper copy of this survey,
it can also be filled in online at www.bath.ac.uk/~mnssg/survey
using the login *ks* and the pasword *rtv*

a) About you

Although this survey is anonymous, we need to know your job description and - most importantly - which company you are from.
The companies have a code number which you should have been told.

a): Company Code

Please select your company code which you should have been told. (It's very importnat we know which company you are from!)

Please choose **only one** of the following:

- ☐ 116
- ☐ 122
- ☐ 129
- ☐ 135
- ☐ 143
- ☐ 162

---

b): Job Description

Please enter your job description or title

Please write your answer here:

---

b) Main Questions

Please rate each question from 1 to 5
where 1 = Strongly disagree and 5 = Strongly agree.

Please answer from your own personal perspective.

1: We are a knowledge-intensive company.

Please choose **only one** of the following

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

2: Knowledge sharing is commonplace in my company.

Please choose **only one** of the following

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

3: We are good at knowledge sharing and it fully meets the needs of the business.

Please choose **only one** of the following

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

4: Knowledge sharing improves the overall performance of my company

Please choose **only one** of the following

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

5: In general, knowledge sharing and learning are valued by my company culture.

Please choose **only one** of the following

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

6: Individuals are recognised and regarded for sharing knowledge.

Please choose **only one** of the following

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

7: The senior management of my company are serious about encouraging knowledge sharing.

Please choose **only one** of the following

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

8: I have access to the technology I need to support knowledge sharing.

Please choose **only one** of the following

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

9: My company evaluates the benefits of sharing knowledge.

Please choose **only one** of the following

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

10: My company has business processes in place to support knowledge sharing.

Please choose **only one** of the following

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

11: The sharing of knowledge within my company is continually improving.

Please choose **only one** of the following

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

12: Our company is better at sharing knowledge than our competitors.

Please choose **only one** of the following

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Submit Your Survey

Thank you for completing this survey. Please fax your completed survey to: 0870 432 3381.

Appendix 2 Survey Statistics and Box Plots

The results by question are given first in terms of descriptive statistics and boxplots.

Results by Question

Boxplots are used in this appendix to give a graphical explanation of the statistics. The structure of a boxplot is explained in Figure 41.

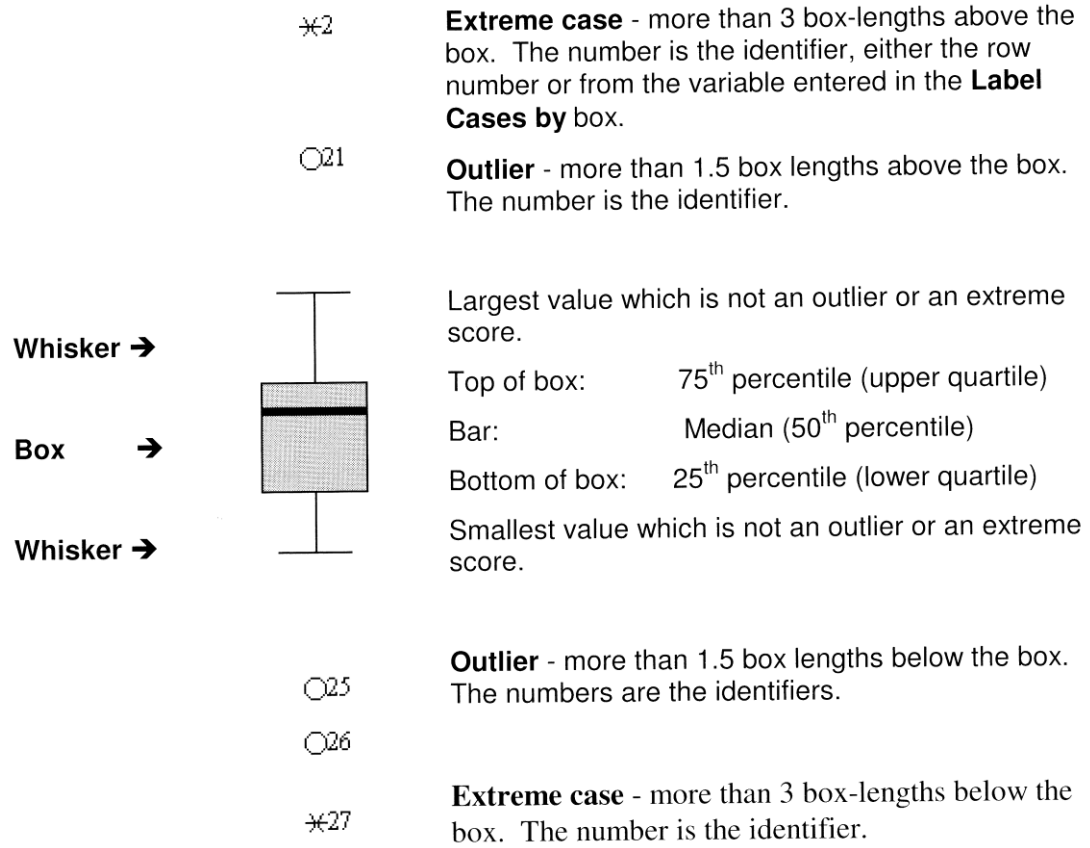
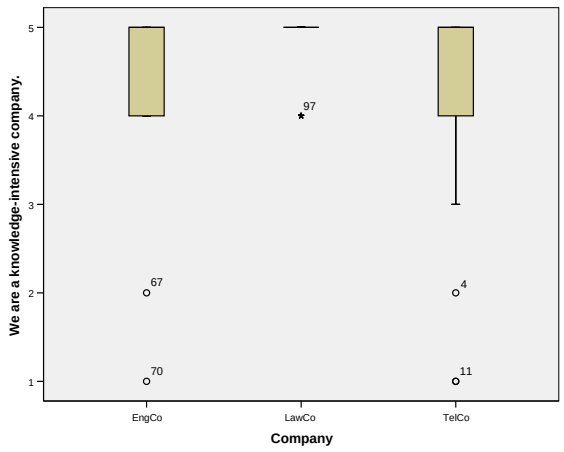


Figure 41: Structure of a Boxplot
(Kinnear & Gray, 2006, p.116)

Q1 - We are a knowledge-intensive company.

	Company			Statistic	Std. Error
We are a knowledge-intensive company.	EngCo	Mean		4.47	.154
		95% Confidence Interval for Mean	Lower Bound	4.16	
			Upper Bound	4.78	
		5% Trimmed Mean		4.61	
		Median		5.00	
		Variance		.802	
		Std. Deviation		.896	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		1	
		Skewness		-2.461	.403
		Kurtosis		7.132	.788
	LawCo	Mean		4.81	.072
		95% Confidence Interval for Mean	Lower Bound	4.66	
			Upper Bound	4.95	
		5% Trimmed Mean		4.84	
		Median		5.00	
		Variance		.161	
		Std. Deviation		.402	
		Minimum		4	
		Maximum		5	
		Range		1	
		Interquartile Range		0	
		Skewness		-1.631	.421
		Kurtosis		.702	.821
	TelCo	Mean		4.47	.154
		95% Confidence Interval for Mean	Lower Bound	4.15	
			Upper Bound	4.78	
		5% Trimmed Mean		4.62	
		Median		5.00	
		Variance		1.017	
		Std. Deviation		1.008	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		1	
		Skewness		-2.385	.361
		Kurtosis		5.616	.709

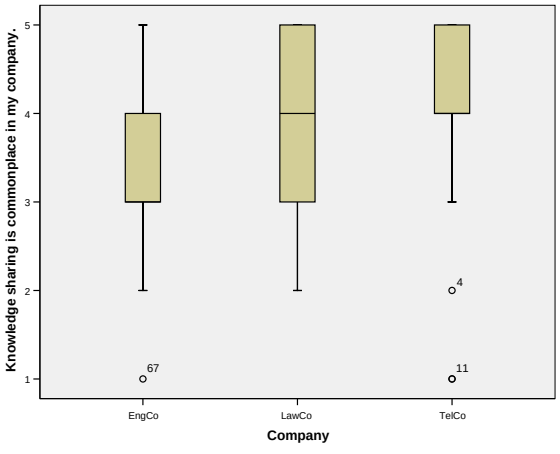
Table 44: Q1 Descriptive Statistics



Q2 - Knowledge sharing is commonplace in my company.

	Company			Statistic	Std. Error
Knowledge sharing is commonplace in my company.	EngCo	Mean		3.32	.145
		95% Confidence Interval for Mean	Lower Bound	3.03	
			Upper Bound	3.62	
		5% Trimmed Mean		3.36	
		Median		3.00	
		Variance		.710	
		Std. Deviation		.843	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		1	
		Skewness		-.694	.403
		Kurtosis		.496	.788
	LawCo	Mean		3.87	.172
		95% Confidence Interval for Mean	Lower Bound	3.52	
			Upper Bound	4.22	
		5% Trimmed Mean		3.91	
		Median		4.00	
		Variance		.916	
		Std. Deviation		.957	
		Minimum		2	
		Maximum		5	
		Range		3	
		Interquartile Range		2	
		Skewness		-.459	.421
		Kurtosis		-.636	.821
	TelCo	Mean		4.05	.172
		95% Confidence Interval for Mean	Lower Bound	3.70	
			Upper Bound	4.40	
		5% Trimmed Mean		4.17	
		Median		4.00	
		Variance		1.155	
		Std. Deviation		1.075	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		1	
		Skewness		-1.313	.378
		Kurtosis		1.629	.741

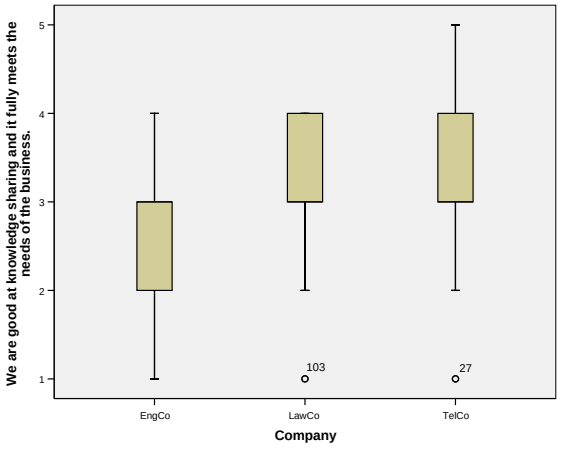
Table 45: Q2 Descriptive Statistics



Q3 - We are good at knowledge sharing and it fully meets the needs of the business

	Company			Statistic	Std. Error
We are good at knowledge sharing and it fully meets the needs of the business.	EngCo	Mean		2.53	.128
		95% Confidence Interval for Mean	Lower Bound	2.27	
			Upper Bound	2.79	
		5% Trimmed Mean		2.53	
		Median		3.00	
		Variance		.560	
		Std. Deviation		.748	
		Minimum		1	
		Maximum		4	
		Range		3	
		Interquartile Range		1	
		Skewness		-.337	.403
		Kurtosis		-.097	.788
	LawCo	Mean		3.10	.156
		95% Confidence Interval for Mean	Lower Bound	2.78	
			Upper Bound	3.42	
		5% Trimmed Mean		3.16	
		Median		3.00	
		Variance		.757	
		Std. Deviation		.870	
		Minimum		1	
		Maximum		4	
		Range		3	
		Interquartile Range		1	
		Skewness		-.845	.421
		Kurtosis		.354	.821
	TelCo	Mean		3.37	.153
		95% Confidence Interval for Mean	Lower Bound	3.06	
			Upper Bound	3.68	
		5% Trimmed Mean		3.41	
		Median		3.00	
		Variance		1.001	
		Std. Deviation		1.001	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		1	
		Skewness		-.378	.361
		Kurtosis		.029	.709

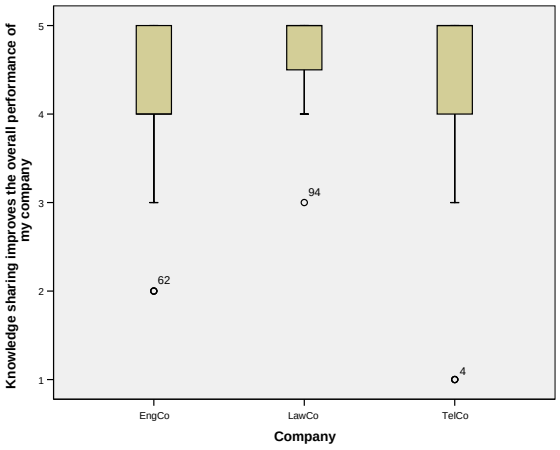
Table 46: Q3 Descriptive Statistics



Q4 - Knowledge sharing improves the overall performance of my company

	Company			Statistic	Std. Error
Knowledge sharing improves the overall performance of my company	EngCo	Mean		4.15	.170
		95% Confidence Interval for Mean	Lower Bound	3.80	
			Upper Bound	4.49	
		5% Trimmed Mean		4.22	
		Median		4.00	
		Variance		.978	
		Std. Deviation		.989	
		Minimum		2	
		Maximum		5	
		Range		3	
		Interquartile Range		1	
		Skewness		-.911	.403
		Kurtosis		-.218	.788
	LawCo	Mean		4.71	.095
		95% Confidence Interval for Mean	Lower Bound	4.52	
			Upper Bound	4.90	
		5% Trimmed Mean		4.77	
		Median		5.00	
		Variance		.280	
		Std. Deviation		.529	
		Minimum		3	
		Maximum		5	
		Range		2	
		Interquartile Range		1	
		Skewness		-1.672	.421
		Kurtosis		2.137	.821
	TelCo	Mean		4.44	.164
		95% Confidence Interval for Mean	Lower Bound	4.11	
			Upper Bound	4.77	
		5% Trimmed Mean		4.60	
		Median		5.00	
		Variance		1.157	
		Std. Deviation		1.076	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		1	
		Skewness		-2.430	.361
		Kurtosis		5.562	.709

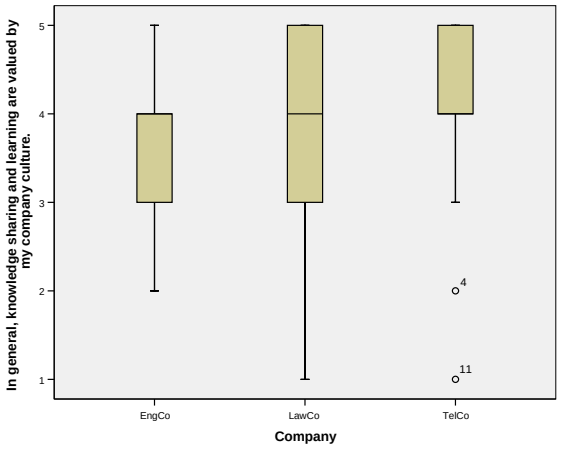
Table 47: Q4 Descriptive Statistics



Q5 - In general, knowledge sharing and learning are valued by my company culture

	Company			Statistic	Std. Error
In general, knowledge sharing and learning are valued by my company culture.	EngCo	Mean		3.53	.154
		95% Confidence Interval for Mean	Lower Bound	3.22	
			Upper Bound	3.84	
		5% Trimmed Mean		3.53	
		Median		4.00	
		Variance		.802	
		Std. Deviation		.896	
		Minimum		2	
		Maximum		5	
		Range		3	
		Interquartile Range		1	
		Skewness		-.228	.403
		Kurtosis		-.605	.788
	LawCo	Mean		3.71	.213
		95% Confidence Interval for Mean	Lower Bound	3.27	
			Upper Bound	4.15	
		5% Trimmed Mean		3.79	
		Median		4.00	
		Variance		1.413	
		Std. Deviation		1.189	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		2	
		Skewness		-.792	.421
		Kurtosis		-.061	.821
	TelCo	Mean		4.33	.132
		95% Confidence Interval for Mean	Lower Bound	4.06	
			Upper Bound	4.59	
		5% Trimmed Mean		4.44	
		Median		4.00	
		Variance		.749	
		Std. Deviation		.865	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		1	
		Skewness		-1.858	.361
		Kurtosis		4.727	.709

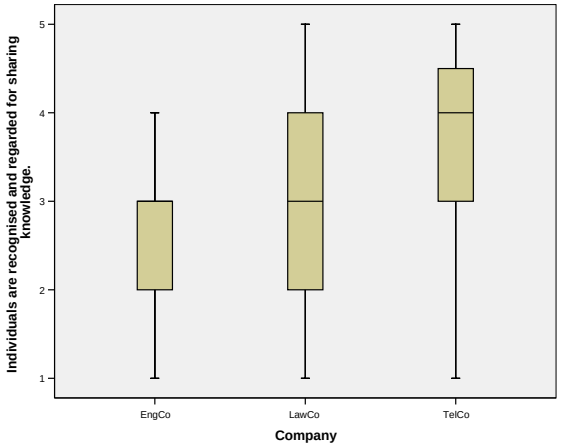
Table 48: Q5 Descriptive Statistics



Q6 - Individuals are recognised and regarded for sharing knowledge

	Company			Statistic	Std. Error
Individuals are recognised and regarded for sharing knowledge.	EngCo	Mean		2.68	.145
		95% Confidence Interval for Mean	Lower Bound	2.38	
			Upper Bound	2.97	
		5% Trimmed Mean		2.70	
		Median		3.00	
		Variance		.710	
		Std. Deviation		.843	
		Minimum		1	
		Maximum		4	
		Range		3	
		Interquartile Range		1	
		Skewness		-.597	.403
		Kurtosis		-.012	.788
	LawCo	Mean		2.97	.215
		95% Confidence Interval for Mean	Lower Bound	2.53	
			Upper Bound	3.41	
		5% Trimmed Mean		2.96	
		Median		3.00	
		Variance		1.432	
		Std. Deviation		1.197	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		2	
		Skewness		.066	.421
		Kurtosis		-.563	.821
	TelCo	Mean		3.63	.166
		95% Confidence Interval for Mean	Lower Bound	3.29	
			Upper Bound	3.96	
		5% Trimmed Mean		3.67	
		Median		4.00	
		Variance		1.192	
		Std. Deviation		1.092	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		2	
		Skewness		-.344	.361
		Kurtosis		-.694	.709

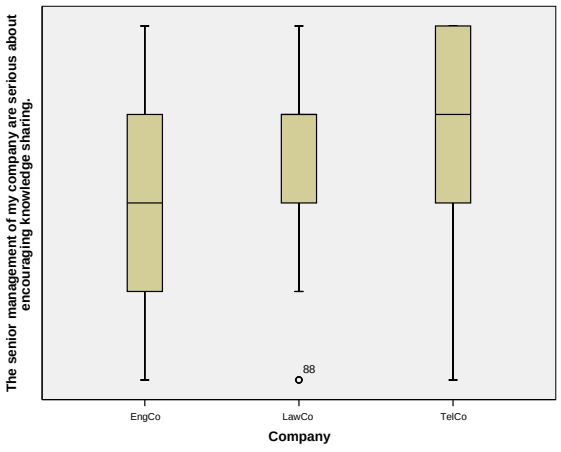
Table 49: Q6 Descriptive Statistics



Q7 - The senior management of my company are serious about encouraging knowledge sharing

	Company			Statistic	Std. Error
The senior management of my company are serious about encouraging knowledge sharing.	EngCo	Mean		3.03	.177
		95% Confidence Interval for Mean	Lower Bound	2.67	
			Upper Bound	3.39	
		5% Trimmed Mean		3.03	
		Median		3.00	
		Variance		1.060	
		Std. Deviation		1.029	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		2	
		Skewness		.116	.403
		Kurtosis		-.239	.788
	LawCo	Mean		3.39	.211
		95% Confidence Interval for Mean	Lower Bound	2.96	
			Upper Bound	3.82	
		5% Trimmed Mean		3.43	
		Median		4.00	
		Variance		1.378	
		Std. Deviation		1.174	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		1	
		Skewness		-.569	.421
		Kurtosis		-.237	.821
	TelCo	Mean		4.07	.164
		95% Confidence Interval for Mean	Lower Bound	3.74	
			Upper Bound	4.40	
		5% Trimmed Mean		4.16	
		Median		4.00	
		Variance		1.162	
		Std. Deviation		1.078	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		2	
		Skewness		-.982	.361
		Kurtosis		.219	.709

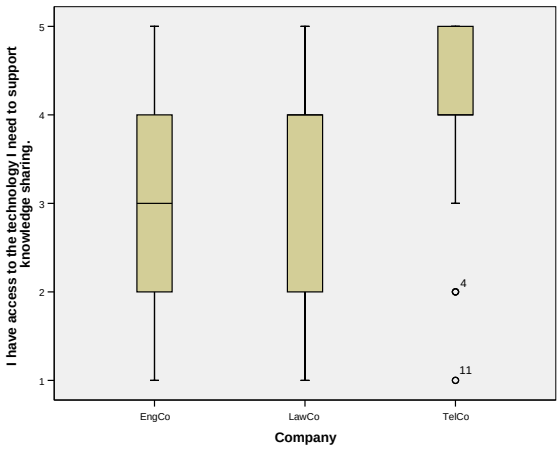
Table 50: Q7 Descriptive Statistics



Q8 - I have access to the technology I need to support knowledge sharing

	Company			Statistic	Std. Error
I have access to the technology I need to support knowledge sharing.	EngCo	Mean		2.91	.191
		95% Confidence Interval for Mean	Lower Bound	2.52	
			Upper Bound	3.30	
		5% Trimmed Mean		2.90	
		Median		3.00	
		Variance		1.234	
		Std. Deviation		1.111	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		2	
		Skewness		.183	.403
		Kurtosis		-.577	.788
	LawCo	Mean		3.13	.240
		95% Confidence Interval for Mean	Lower Bound	2.64	
			Upper Bound	3.62	
		5% Trimmed Mean		3.14	
		Median		4.00	
		Variance		1.783	
		Std. Deviation		1.335	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		2	
		Skewness		-.341	.421
		Kurtosis		-1.168	.821
	TelCo	Mean		4.05	.170
		95% Confidence Interval for Mean	Lower Bound	3.70	
			Upper Bound	4.39	
		5% Trimmed Mean		4.16	
		Median		4.00	
		Variance		1.236	
		Std. Deviation		1.112	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		1	
		Skewness		-1.295	.361
		Kurtosis		1.172	.709

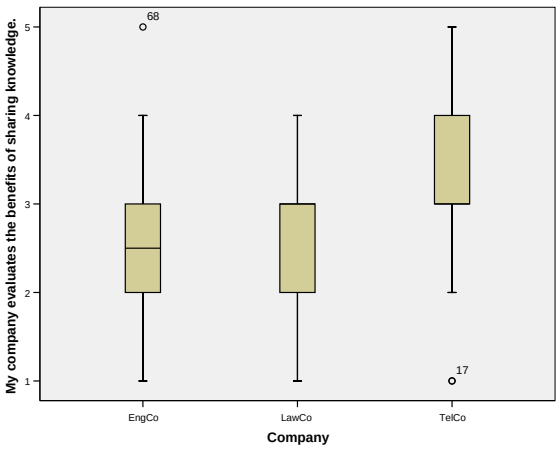
Table 51: Q8 Descriptive Statistics


I have access to the technology I need to support knowledge sharing.
5
4
3
2
1
4
11
EngCo
LawCo
TelCo
Company

Q9 - My company evaluates the benefits of sharing knowledge

	Company			Statistic	Std. Error
My company evaluates the benefits of sharing knowledge.	EngCo	Mean		2.68	.173
		95% Confidence Interval for Mean	Lower Bound	2.33	
			Upper Bound	3.03	
		5% Trimmed Mean		2.66	
		Median		2.50	
		Variance		1.013	
		Std. Deviation		1.007	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		1	
		Skewness		.335	.403
		Kurtosis		-.555	.788
	LawCo	Mean		2.55	.185
		95% Confidence Interval for Mean	Lower Bound	2.17	
			Upper Bound	2.93	
		5% Trimmed Mean		2.55	
		Median		3.00	
		Variance		1.056	
		Std. Deviation		1.028	
		Minimum		1	
		Maximum		4	
		Range		3	
		Interquartile Range		1	
		Skewness		-.336	.421
		Kurtosis		-1.007	.821
	TelCo	Mean		3.42	.177
		95% Confidence Interval for Mean	Lower Bound	3.06	
			Upper Bound	3.78	
		5% Trimmed Mean		3.46	
		Median		3.00	
		Variance		1.344	
		Std. Deviation		1.159	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		1	
		Skewness		-.225	.361
		Kurtosis		-.813	.709

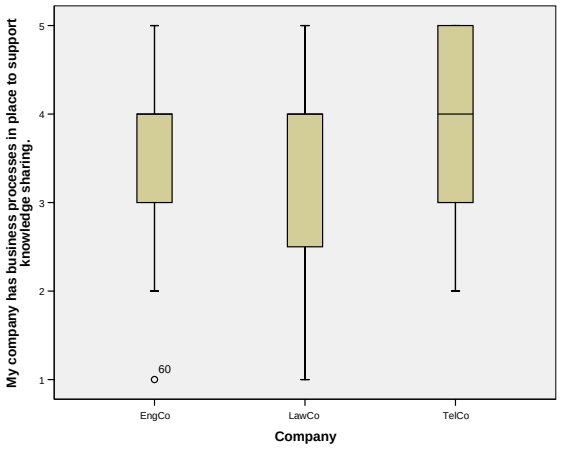
Table 52: Q9 Descriptive Statistics



Q10 - My company has business processes in place to support knowledge sharing

	Company			Statistic	Std. Error
My company has business processes in place to support knowledge sharing.	EngCo	Mean		3.41	.141
		95% Confidence Interval for Mean	Lower Bound	3.13	
			Upper Bound	3.70	
		5% Trimmed Mean		3.46	
		Median		4.00	
		Variance		.674	
		Std. Deviation		.821	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		1	
		Skewness		-.922	.403
		Kurtosis		1.070	.788
	LawCo	Mean		3.26	.207
		95% Confidence Interval for Mean	Lower Bound	2.83	
			Upper Bound	3.68	
		5% Trimmed Mean		3.29	
		Median		4.00	
		Variance		1.331	
		Std. Deviation		1.154	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		2	
		Skewness		-.544	.421
		Kurtosis		-.519	.821
	TelCo	Mean		3.86	.147
		95% Confidence Interval for Mean	Lower Bound	3.56	
			Upper Bound	4.16	
		5% Trimmed Mean		3.90	
		Median		4.00	
		Variance		.932	
		Std. Deviation		.966	
		Minimum		2	
		Maximum		5	
		Range		3	
		Interquartile Range		2	
		Skewness		-.374	.361
		Kurtosis		-.830	.709

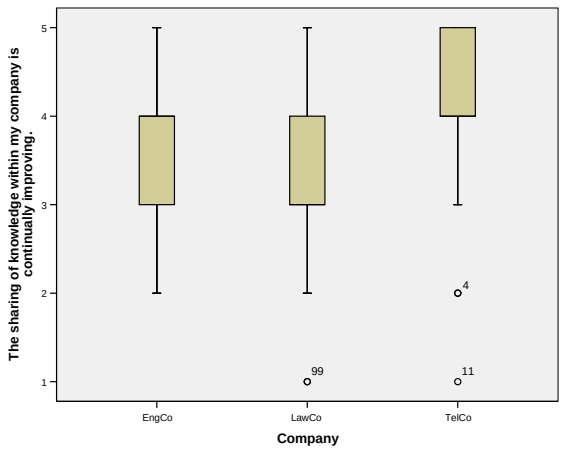
Table 53: Q10 Descriptive Statistics



Q11 - The sharing of knowledge within my company is continually improving

	Company			Statistic	Std. Error
The sharing of knowledge within my company is continually improving.	EngCo	Mean		3.50	.135
		95% Confidence Interval for Mean	Lower Bound	3.22	
			Upper Bound	3.78	
		5% Trimmed Mean		3.50	
		Median		4.00	
		Variance		.621	
		Std. Deviation		.788	
		Minimum		2	
		Maximum		5	
		Range		3	
		Interquartile Range		1	
		Skewness		-.395	.403
		Kurtosis		-.267	.788
	LawCo	Mean		3.19	.170
		95% Confidence Interval for Mean	Lower Bound	2.85	
			Upper Bound	3.54	
		5% Trimmed Mean		3.23	
		Median		3.00	
		Variance		.895	
		Std. Deviation		.946	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		1	
		Skewness		-.666	.421
		Kurtosis		.245	.821
	TelCo	Mean		4.00	.145
		95% Confidence Interval for Mean	Lower Bound	3.71	
			Upper Bound	4.29	
		5% Trimmed Mean		4.08	
		Median		4.00	
		Variance		.905	
		Std. Deviation		.951	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		1	
		Skewness		-1.045	.361
		Kurtosis		1.270	.709

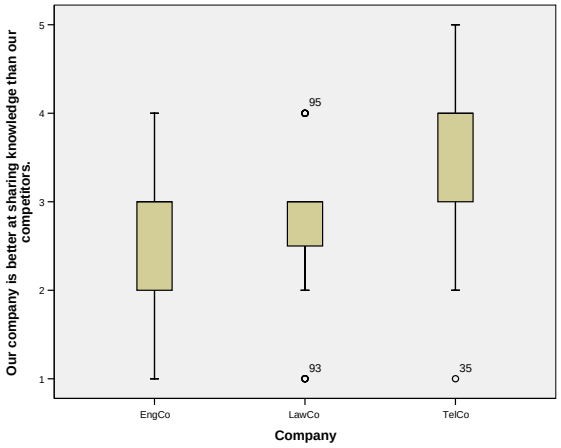
Table 54: Q11 Descriptive Statistics



Q12 - Our company is better at sharing knowledge than our competitors

	Company			Statistic	Std. Error
Our company is better at sharing knowledge than our competitors.	EngCo	Mean		2.56	.141
		95% Confidence Interval for Mean	Lower Bound	2.27	
			Upper Bound	2.85	
		5% Trimmed Mean		2.57	
		Median		3.00	
		Variance		.678	
		Std. Deviation		.824	
		Minimum		1	
		Maximum		4	
		Range		3	
		Interquartile Range		1	
		Skewness		-.372	.403
		Kurtosis		-.276	.788
	LawCo	Mean		2.81	.176
		95% Confidence Interval for Mean	Lower Bound	2.45	
			Upper Bound	3.17	
		5% Trimmed Mean		2.84	
		Median		3.00	
		Variance		.961	
		Std. Deviation		.980	
		Minimum		1	
		Maximum		4	
		Range		3	
		Interquartile Range		1	
		Skewness		-.719	.421
		Kurtosis		-.296	.821
	TelCo	Mean		3.63	.160
		95% Confidence Interval for Mean	Lower Bound	3.31	
			Upper Bound	3.95	
		5% Trimmed Mean		3.67	
		Median		4.00	
		Variance		1.096	
		Std. Deviation		1.047	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		1	
		Skewness		-.356	.361
		Kurtosis		-.472	.709

Table 55: Q12 Descriptive Statistics



Appendix 3 Survey Histograms

Results by Company

TelCo

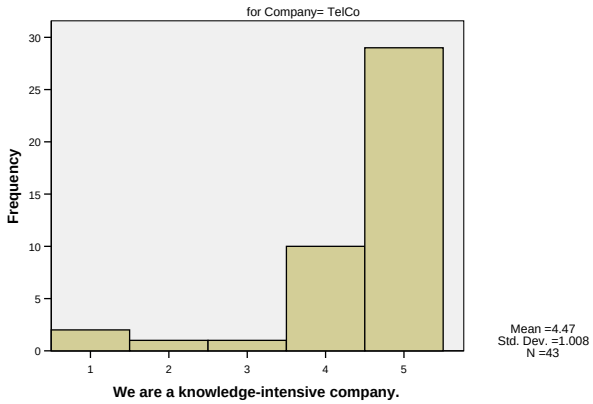


Figure 42: TelCo Q1

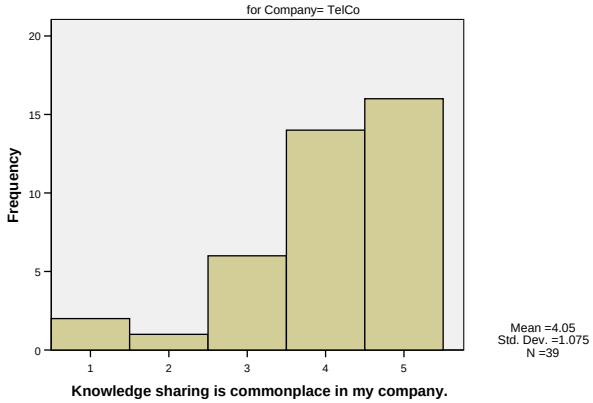


Figure 43: TelCo Q2

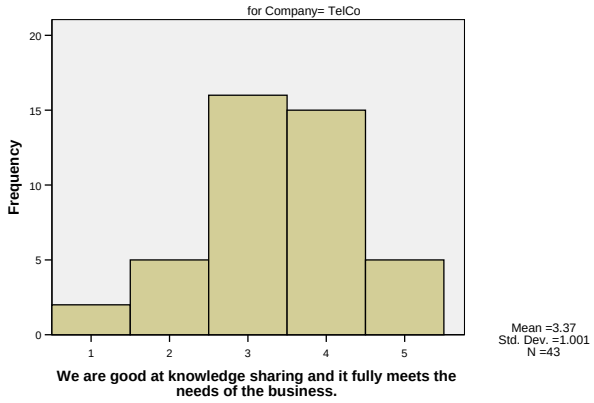


Figure 44: TelCo Q3

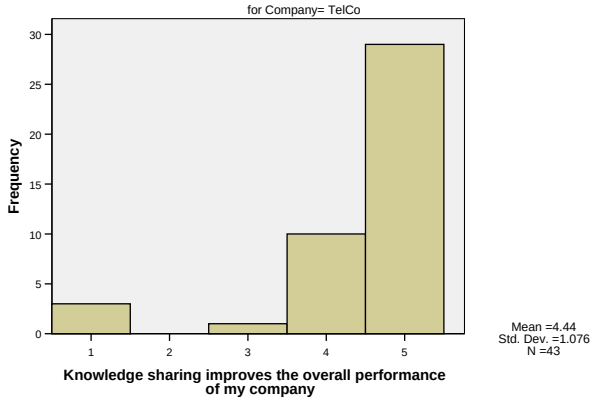


Figure 45: TelCo Q4

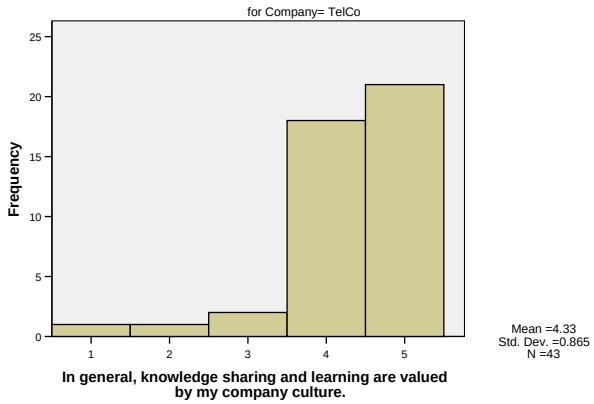


Figure 46: TelCo Q5

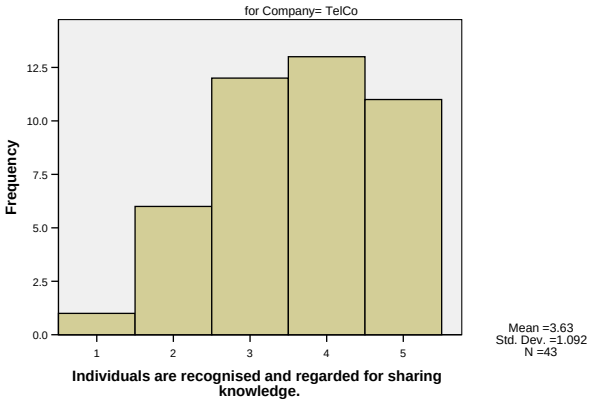


Figure 47: TelCo Q6

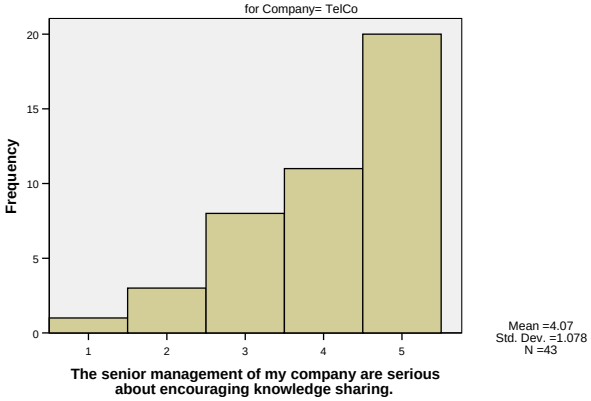


Figure 48: TelCo Q7

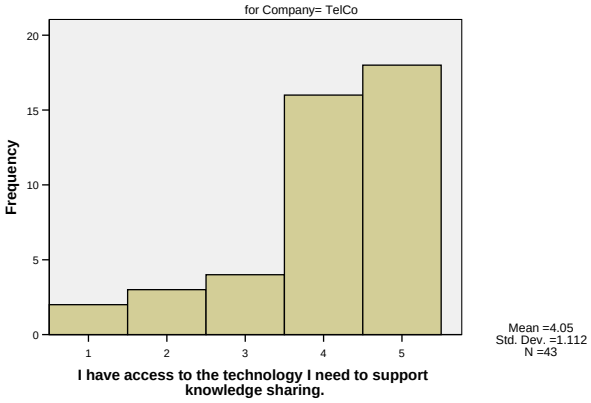


Figure 49: TelCo Q8

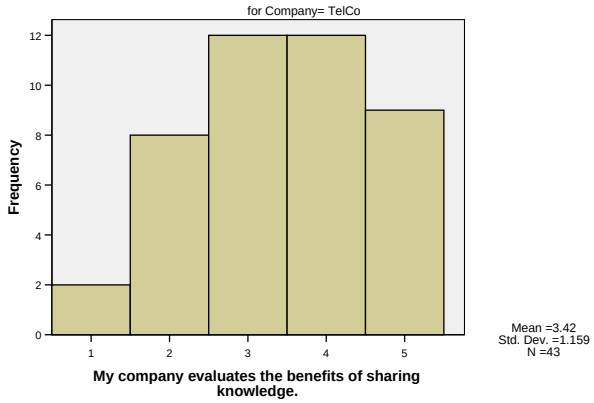


Figure 50: TelCo Q9

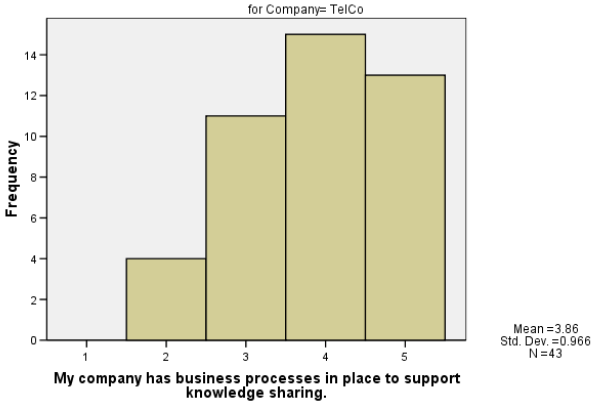


Figure 51: TelCo Q10

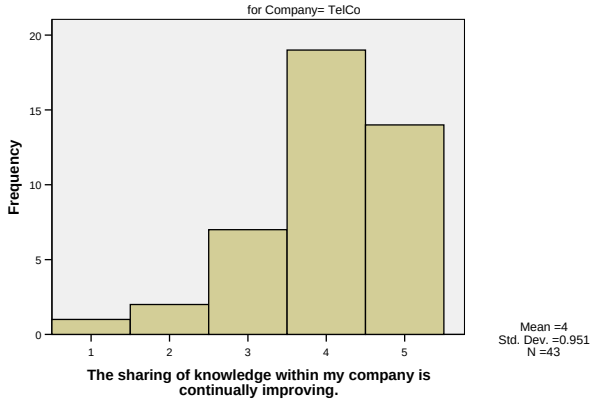


Figure 52: TelCo Q11

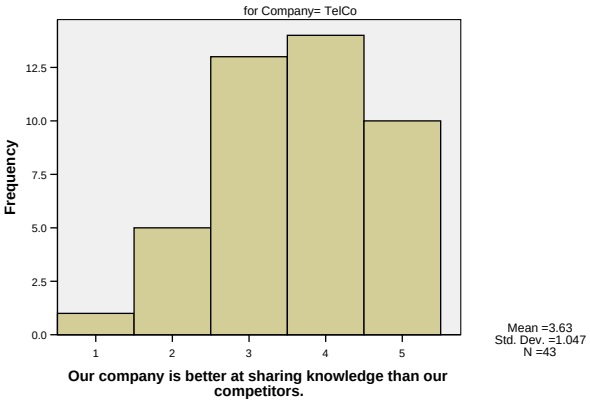


Figure 53: TelCo Q12

LawCo

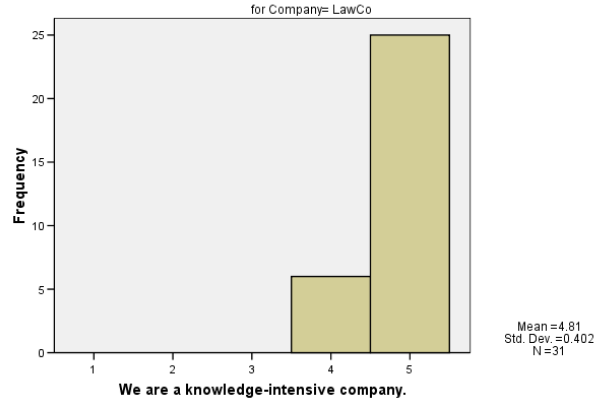


Figure 54: LawCo Q1

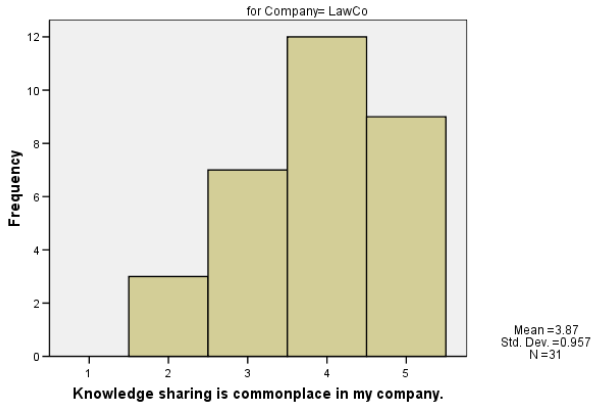


Figure 55: LawCo Q2

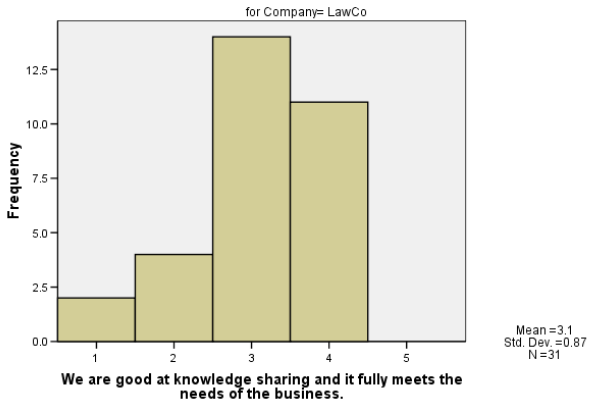


Figure 56: LawCo Q3

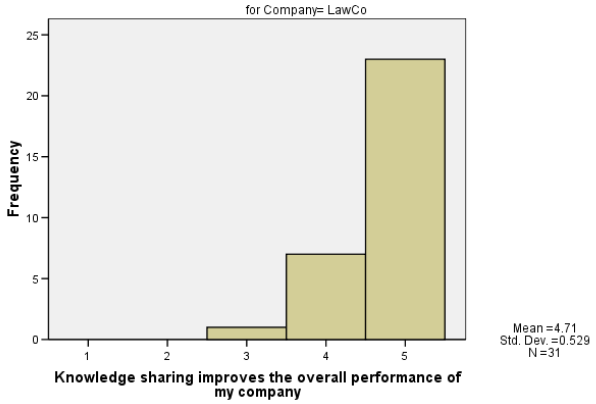


Figure 57: LawCo Q4

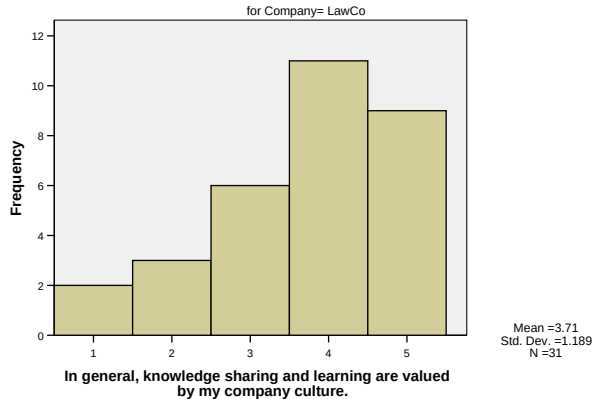


Figure 58: LawCo Q5

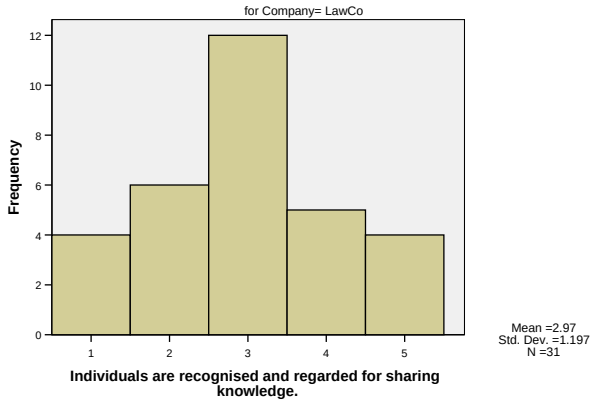


Figure 59: LawCo Q6

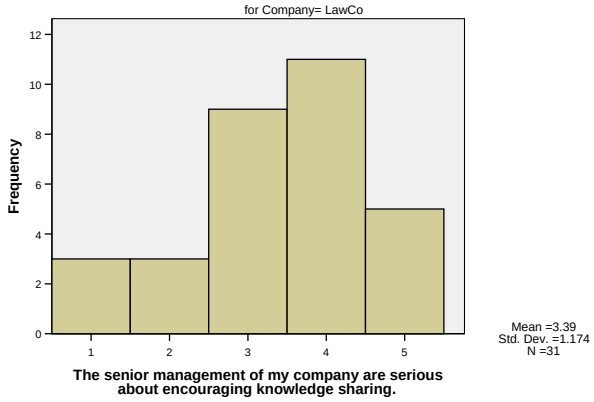


Figure 60: LawCo Q7

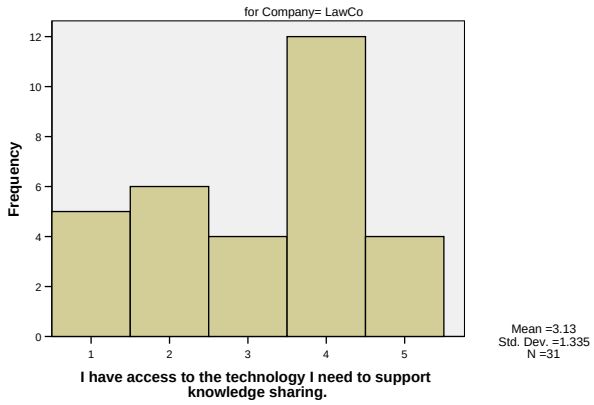


Figure 61: LawCo Q8

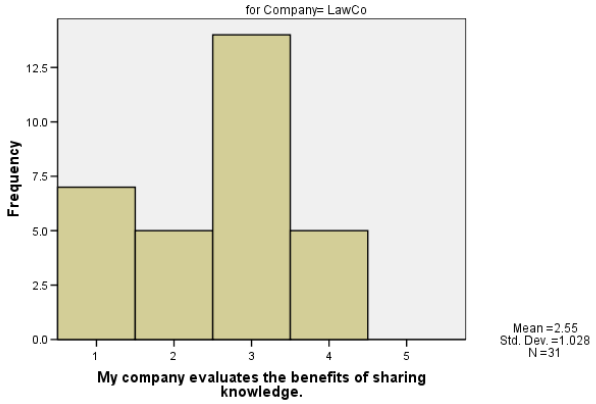


Figure 62: LawCo Q9

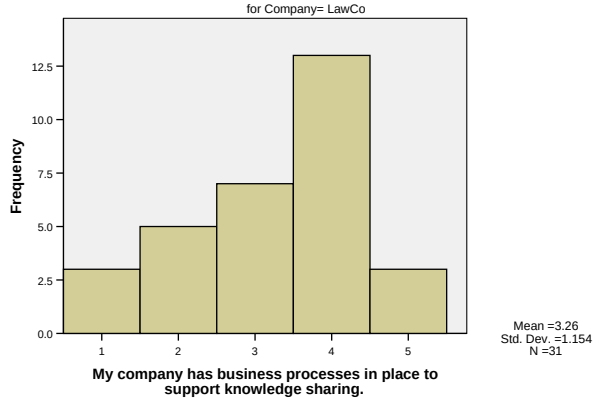


Figure 63: LawCo Q10

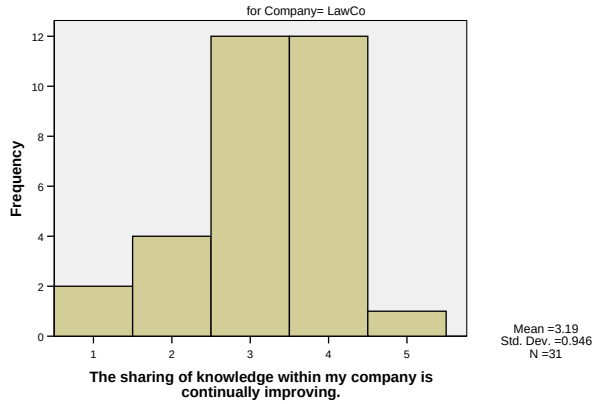


Figure 64: LawCo Q11

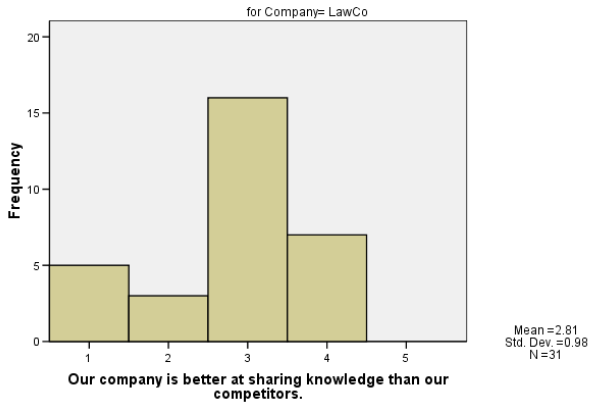


Figure 65: LawCo Q12

EngCo

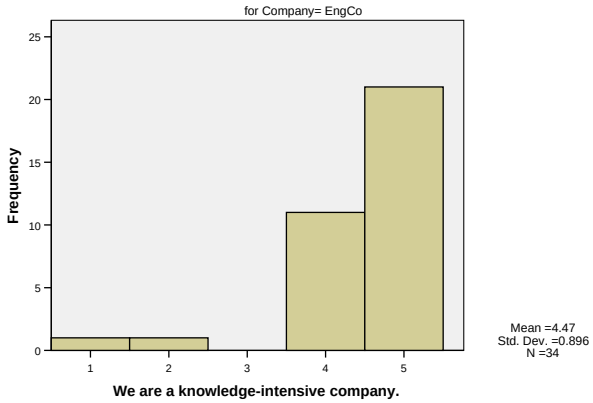


Figure 66: EngCo Q1

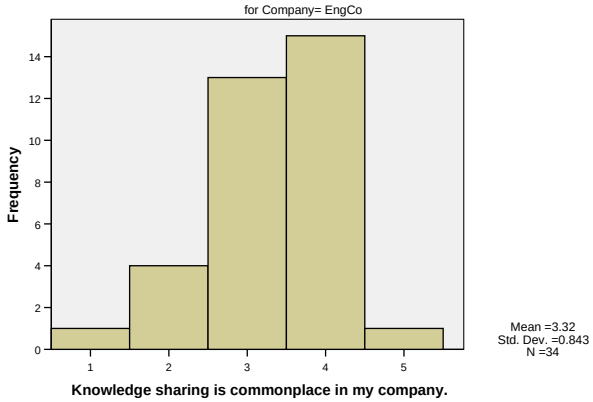


Figure 67: EngCo Q2

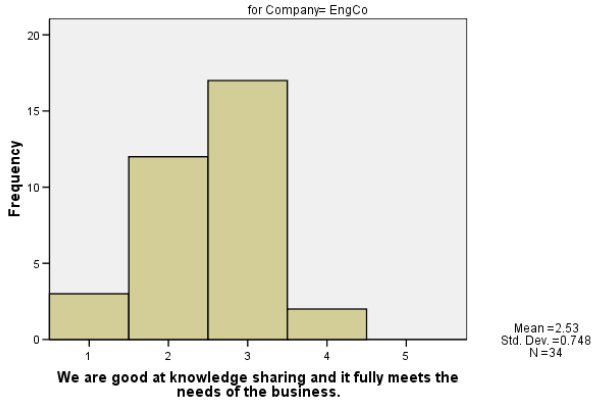


Figure 68: EngCo Q3

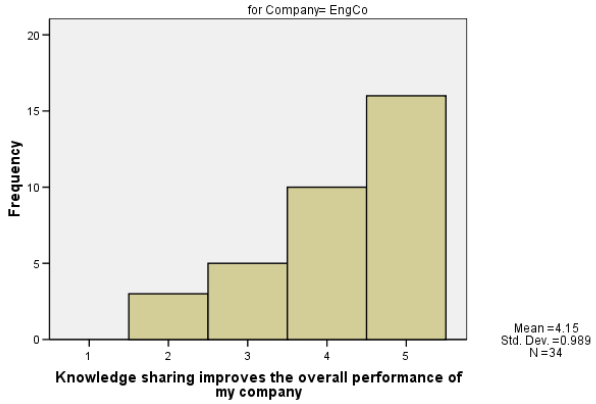


Figure 69: EngCo Q4

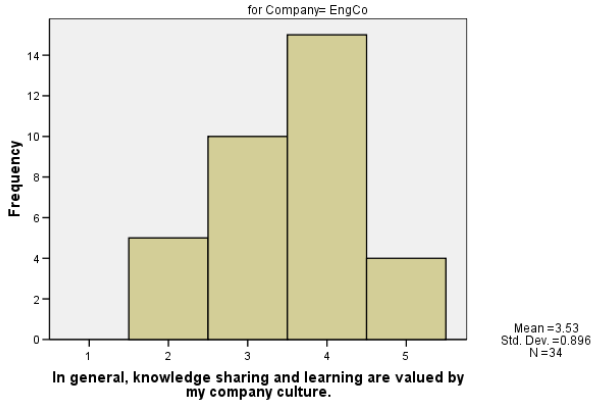


Figure 70: EngCo Q5

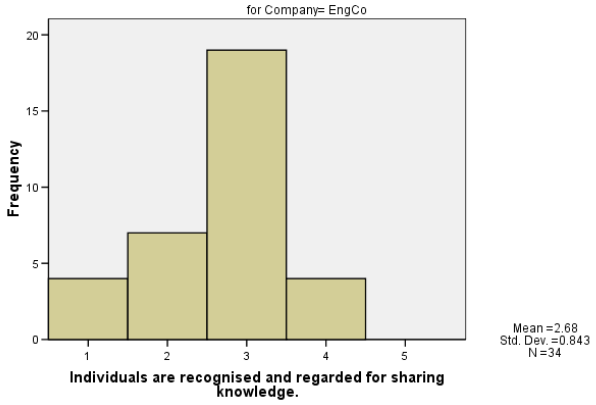


Figure 71: EngCo Q6

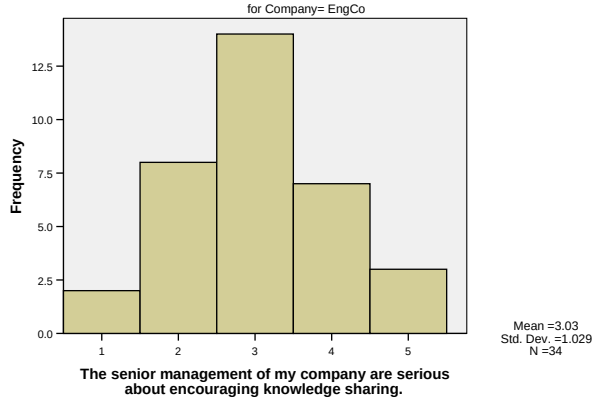


Figure 72: EngCo Q7

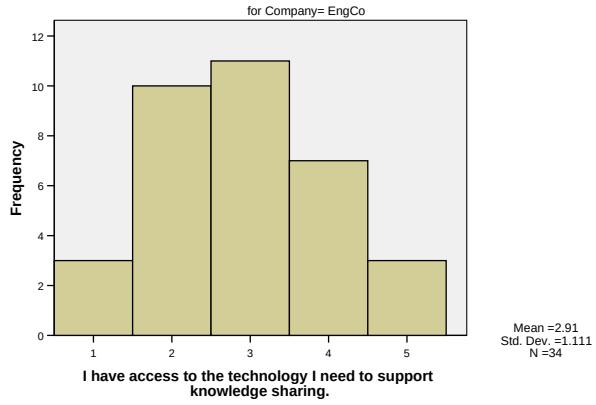


Figure 73: EngCo Q8

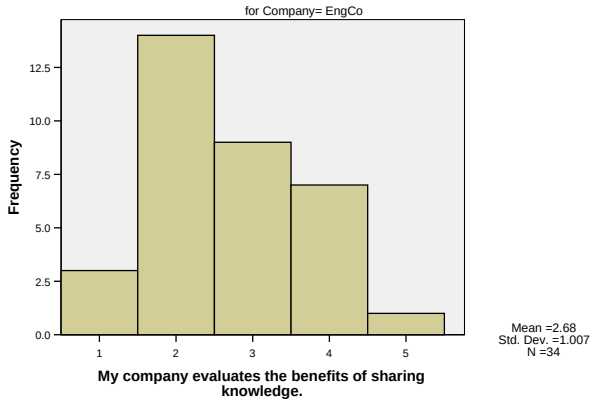


Figure 74: EngCo Q9

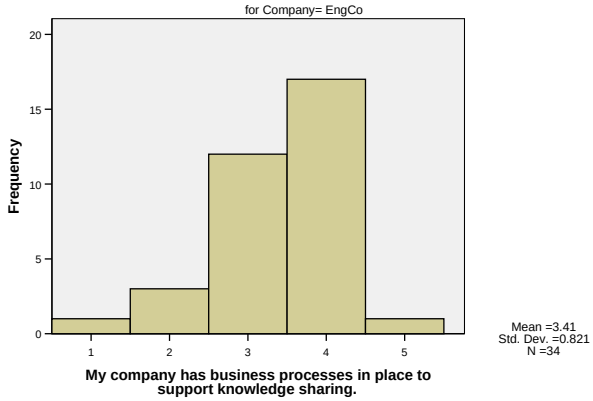


Figure 75: EngCo Q10

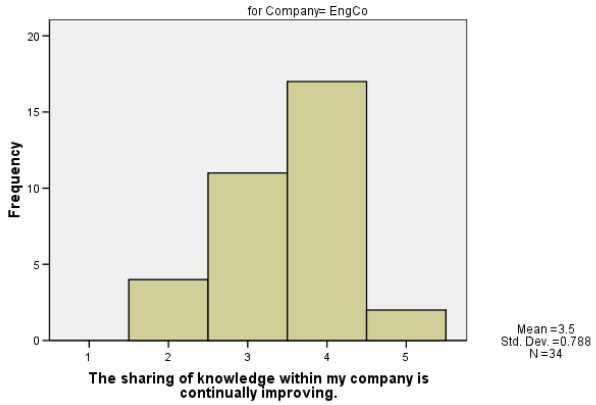


Figure 76: EngCo Q11

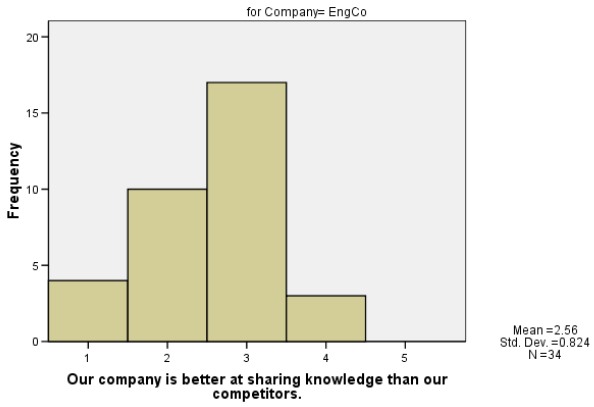


Figure 77: EngCo Q12

Appendix 4 Survey Respondents

Respondents detailed job descriptions:

Business Manager	Sales Manager	Specialist Sales Professional
Account Director	Sales Manager	Strategic Communications Manager
Account Manager	Account Manager	Corporate Mobile Account Manager
Desk Based Account Manager	Account Director	HR Manager
Senior Sales Professional	Senior Sales Professional	Senior Bid Manager
Sales Professional	Sector Marketing Manager	Industry Marketing Manager
Sales Support Manager	Sales Manager	Consulting and SI Sales
Industry Marketing Manager	Sales Manager	Campaign Manager
Account Director	Sales Specialist	Marketing Communications Manager
Account Manager	Key Account Manager	Sales Manager
Account Director	CRM Sales Specialist	Service Agility Team Manager
Account Director	Data Specialist	Sales Manager
Technical Sales Consultant	Finance Manager	Sales Specialist
Account Manager	Sales Professional	
Account Director	Support Manager	

Table 56: TelCo Survey Respondents (42)

PSL - 7 PQE	PSL - 18 PQE	PSL
PSL	Associate	Lawyer
PSL – Employment	Litigation – Trainee	Lawyer - CFI - 1 PQE
Solicitor - 4 PQE	Associate	Solicitor PQE 3
PSL	Solicitor	Department CDC
1.5 PQE – CDC	KM Assistant	Solicitor 5 PQE
10 PQE PSL	Head of KM - 15 PQE	8 PQE
Tax and Trusts PQE 1	Trainee Solicitor	3 PQE
Tax & Trusts 2 PQE	Trainee Solicitor	Solicitor - 5 PQE
Partner	Associate Solicitor	Solicitor
		2 PQE

Table 57: LawCo Respondents (31)

(NB: PSL = Professional Support Lawyer. PQE = Years post-qualification experience.)

KM and Business Improvement Specialist	Helicopter Advanced Experimental Engineer
KM Specialist	Knowledge Specialist
Stress Engineer	Service Systems Programme Controller
Engineering Manager	Customer Support Role
Market Analysis Team Leader	Gas Turbine Support Engineer
Chief of System Integration	Head of Engineering Improvements
Principal Design Engineer	Integrated Programme Team Leader
Engineering Quality Specialist	Technical/Project Manager
Engineering Intranet Leader	Design Skill Management

Web Editor	Head of Research & Technology
Business Improvement Manager	Business Improvement Specialist
Material Specialist	Team Leader Fluid Systems
Chief of Engine Structures	Integrated Project Team Leader
VP Corporate Venturing	Engineering Business Manager
Chief Service Engineer	Head of Commercial Development
Training & Development	HR Adviser – Quality
Global Intranet Manager	Training Manager – Engineering
IPT Leader	Chief of Functional Engineering
Electrical Systems Specialist	Engineering Fellow
Vibration Engineer	e-Business Strategy & Collaboration
Service Engineering Specialist	Risk System Professional
Corporate Development Executive	

Table 58: EngCo Respondents (43)

Appendix 5 NVivo Nodes

Business Benefits of K			
		Words Coded	1,049
Created	18/05/2007 13:51	**Paragraphs Coded**	29
Modified	16/06/2008 10:19	**Coding References**	18
		Sources Coded	14
		Cases Coded	14

Buzz word problem			
		Words Coded	189
Created	18/05/2007 13:53	**Paragraphs Coded**	8
Modified	16/06/2008 14:20	**Coding References**	4
		Sources Coded	4
		Cases Coded	4

Collecting v Donating knowledge			
		Words Coded	1,734
Created	18/05/2007 13:55	**Paragraphs Coded**	47
Modified	16/06/2008 16:19	**Coding References**	23
		Sources Coded	17
		Cases Coded	16

Connecting People			
		Words Coded	1,792
Created	18/05/2007 13:52	**Paragraphs Coded**	15
Modified	16/06/2008 10:41	**Coding**	16

		References	
		Sources Coded	10
		Cases Coded	10

CoP

		Words Coded	261
Created	08/04/2008 15:59	**Paragraphs Coded**	3
Modified	16/06/2008 14:25	**Coding References**	3
		Sources Coded	3
		Cases Coded	3

Culture - effects of

		Words Coded	1,153
Created	18/05/2007 13:53	**Paragraphs Coded**	21
Modified	16/06/2008 14:25	**Coding References**	16
		Sources Coded	12
		Cases Coded	12

Data - Information - Knowledge

		Words Coded	2,026
Created	18/05/2007 13:55	**Paragraphs Coded**	44
Modified	16/06/2008 12:05	**Coding References**	30
		Sources Coded	19
		Cases Coded	19

Different Knowledge for Different People

		Words Coded	362
Created	18/05/2007 13:53	**Paragraphs Coded**	3

Modified	16/06/2008 14:20	**Coding References**	3
		Sources Coded	3
		Cases Coded	3

Discussion forums

		Words Coded	541
Created	18/05/2007 13:54	**Paragraphs Coded**	13
Modified	16/06/2008 14:25	**Coding References**	9
		Sources Coded	8
		Cases Coded	8

Evaluation processes

		Words Coded	219
Created	18/05/2007 13:54	**Paragraphs Coded**	14
Modified	08/06/2008 15:15	**Coding References**	6
		Sources Coded	5
		Cases Coded	5

Executive ownership of KM

		Words Coded	945
Created	18/05/2007 13:51	**Paragraphs Coded**	33
Modified	16/06/2008 14:25	**Coding References**	16
		Sources Coded	9
		Cases Coded	9

Indicators

		Words Coded	1,561
Created	18/05/2007 13:54	**Paragraphs**	36

		Coded	
Modified	16/06/2008 14:25	**Coding References**	30
		Sources Coded	20
		Cases Coded	20
Instant Messaging			
		Words Coded	109
Created	18/05/2007 13:54	**Paragraphs Coded**	5
Modified	14/06/2008 14:28	**Coding References**	3
		Sources Coded	2
		Cases Coded	2
Intranet			
		Words Coded	215
Created	18/05/2007 13:54	**Paragraphs Coded**	5
Modified	16/06/2008 16:21	**Coding References**	5
		Sources Coded	4
		Cases Coded	4
Job Description			
		Words Coded	783
Created	20/03/2008 13:59	**Paragraphs Coded**	3
Modified	16/06/2008 10:19	**Coding References**	3
		Sources Coded	3
		Cases Coded	3
KM - what it is			
		Words Coded	171

Created	18/05/2007 13:55	**Paragraphs Coded**	3
Modified	09/05/2008 14:27	**Coding References**	3
		Sources Coded	2
		Cases Coded	2

Know who is important

		Words Coded	387
Created	18/05/2007 13:53	**Paragraphs Coded**	8
Modified	09/05/2008 14:21	**Coding References**	8
		Sources Coded	4
		Cases Coded	4

Knowledge & KM

		Words Coded	0
Created	28/02/2007 09:50	**Paragraphs Coded**	0
Modified	18/05/2007 13:50	**Coding References**	0
		Sources Coded	0
		Cases Coded	0

Knowledge is Power

		Words Coded	302
Created	18/05/2007 13:53	**Paragraphs Coded**	11
Modified	16/06/2008 16:19	**Coding References**	8
		Sources Coded	8
		Cases Coded	8

Knowledge processes

		Words Coded	2,406
Created	18/05/2007 13:53	**Paragraphs Coded**	64
Modified	16/06/2008 14:25	**Coding References**	37
		Sources Coded	19
		Cases Coded	18

Knowledge quality

		Words Coded	17
Created	18/05/2007 13:55	**Paragraphs Coded**	1
Modified	14/06/2008 10:38	**Coding References**	1
		Sources Coded	1
		Cases Coded	1

Knowledge Strategy

		Words Coded	1,617
Created	18/05/2007 13:51	**Paragraphs Coded**	53
Modified	10/08/2008 15:57	**Coding References**	35
		Sources Coded	22
		Cases Coded	21

Knowledge Transfer

		Words Coded	279
Created	18/05/2007 13:53	**Paragraphs Coded**	6
Modified	09/05/2008 11:55	**Coding References**	4
		Sources Coded	2
		Cases Coded	2

KRT			
		Words Coded	533
Created	18/05/2007 13:54	**Paragraphs Coded**	23
Modified	16/06/2008 12:05	**Coding References**	8
		Sources Coded	6
		Cases Coded	6

KS Measurement			
		Words Coded	0
Created	28/02/2007 09:52	**Paragraphs Coded**	0
Modified	28/02/2007 09:52	**Coding References**	0
		Sources Coded	0
		Cases Coded	0

Learning from Practice			
		Words Coded	380
Created	18/05/2007 13:54	**Paragraphs Coded**	5
Modified	11/06/2008 17:49	**Coding References**	4
		Sources Coded	3
		Cases Coded	3

Linkages			
		Words Coded	3,535
Created	08/06/2008 14:50	**Paragraphs Coded**	63
Modified	10/08/2008 15:57	**Coding References**	60
		Sources Coded	18

		Cases Coded	18
Measurement Problems			
		Words Coded	300
Created	18/05/2007 13:54	**Paragraphs Coded**	3
Modified	16/06/2008 14:25	**Coding References**	4
		Sources Coded	3
		Cases Coded	3
Motivation			
		Words Coded	2,369
Created	18/05/2007 13:53	**Paragraphs Coded**	58
Modified	10/08/2008 15:57	**Coding References**	43
		Sources Coded	20
		Cases Coded	20
Organizational Structure			
		Words Coded	3,148
Created	18/05/2007 13:52	**Paragraphs Coded**	89
Modified	16/06/2008 16:19	**Coding References**	58
		Sources Coded	23
		Cases Coded	22
People-Culture			
		Words Coded	0
Created	18/05/2007 13:50	**Paragraphs Coded**	0
Modified	18/05/2007 13:50	**Coding References**	0

		Sources Coded	0
		Cases Coded	0

Process

		Words Coded	26
Created	18/05/2007 13:50	**Paragraphs Coded**	1
Modified	10/06/2008 14:55	**Coding References**	1
		Sources Coded	1
		Cases Coded	1

Responsibility for KS

		Words Coded	220
Created	18/05/2007 13:52	**Paragraphs Coded**	2
Modified	14/06/2008 14:28	**Coding References**	2
		Sources Coded	2
		Cases Coded	2

Rewards for sharing

		Words Coded	385
Created	18/05/2007 13:53	**Paragraphs Coded**	10
Modified	10/08/2008 15:57	**Coding References**	7
		Sources Coded	5
		Cases Coded	5

Role of Knowledge in Org

		Words Coded	226
Created	18/05/2007 13:51	**Paragraphs Coded**	11
Modified	14/06/2008 11:01	**Coding**	7

		References	
		Sources Coded	6
		Cases Coded	6

Sharing techniques

		Words Coded	0
Created	18/05/2007 13:54	**Paragraphs Coded**	0
Modified	18/05/2007 13:54	**Coding References**	0
		Sources Coded	0
		Cases Coded	0

Size problems

		Words Coded	92
Created	18/05/2007 13:52	**Paragraphs Coded**	10
Modified	14/06/2008 10:38	**Coding References**	3
		Sources Coded	3
		Cases Coded	3

Skills and behaviours

		Words Coded	1,849
Created	18/05/2007 13:53	**Paragraphs Coded**	45
Modified	10/08/2008 15:57	**Coding References**	26
		Sources Coded	21
		Cases Coded	21

SNA

		Words Coded	483
Created	18/05/2007 13:54	**Paragraphs Coded**	1

Modified	09/05/2008 14:21	**Coding References**	1
		Sources Coded	1
		Cases Coded	1

Storytelling

		Words Coded	188
Created	18/05/2007 13:54	**Paragraphs Coded**	4
Modified	16/06/2008 10:19	**Coding References**	2
		Sources Coded	1
		Cases Coded	1

Strategy

		Words Coded	0
Created	18/05/2007 13:50	**Paragraphs Coded**	0
Modified	18/05/2007 13:50	**Coding References**	0
		Sources Coded	0
		Cases Coded	0

Structure

		Words Coded	0
Created	18/05/2007 13:50	**Paragraphs Coded**	0
Modified	18/05/2007 13:50	**Coding References**	0
		Sources Coded	0
		Cases Coded	0

Tacit v Explicit

		Words Coded	631
Created	18/05/2007 13:55	**Paragraphs**	10

		Coded	
Modified	16/06/2008 14:20	**Coding References**	8
		Sources Coded	8
		Cases Coded	8
Tagging			
		Words Coded	136
Created	18/05/2007 13:54	**Paragraphs Coded**	1
Modified	14/06/2008 14:28	**Coding References**	1
		Sources Coded	1
		Cases Coded	1
Technology			
		Words Coded	0
Created	18/05/2007 13:50	**Paragraphs Coded**	0
Modified	18/05/2007 13:50	**Coding References**	0
		Sources Coded	0
		Cases Coded	0
Technology - collaboration			
		Words Coded	902
Created	18/05/2007 13:53	**Paragraphs Coded**	25
Modified	16/06/2008 16:19	**Coding References**	14
		Sources Coded	10
		Cases Coded	10
Technology - Negative			
		Words Coded	406

Created	18/05/2007 13:53	**Paragraphs Coded**	21
Modified	16/06/2008 16:19	**Coding References**	10
		Sources Coded	7
		Cases Coded	7

Technology - Searching

		Words Coded	333
Created	29/04/2008 10:35	**Paragraphs Coded**	8
Modified	10/08/2008 15:57	**Coding References**	8
		Sources Coded	6
		Cases Coded	6

Technology - use of

		Words Coded	1,563
Created	18/05/2007 13:53	**Paragraphs Coded**	36
Modified	16/06/2008 14:25	**Coding References**	23
		Sources Coded	16
		Cases Coded	16

Time Constraints & Priotities

		Words Coded	305
Created	18/05/2007 13:53	**Paragraphs Coded**	5
Modified	16/06/2008 12:05	**Coding References**	5
		Sources Coded	4
		Cases Coded	4

Time sheets

		Words Coded	1,029
Created	18/05/2007 13:53	**Paragraphs Coded**	20
Modified	14/06/2008 10:38	**Coding References**	14
		Sources Coded	8
		Cases Coded	8